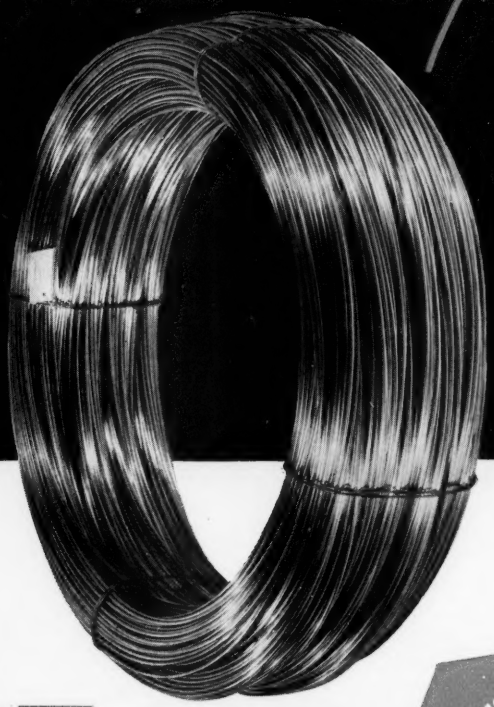
WIRE AND WIRE PRODUCTS

FEBRUARY 1936

REPUBLIC STEEL



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AND WIRE ROD-
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Fine Finish

Easy to Fabricate

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GENERAL OFFICES · · · CLEVELAND, OHIO

WIRE DIVISION . . . OFFICES AND PLANTS
7850 SOUTH CHICAGO AVENUE, CHICAGO, ILLINOIS

REPUBLIC STEEL

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

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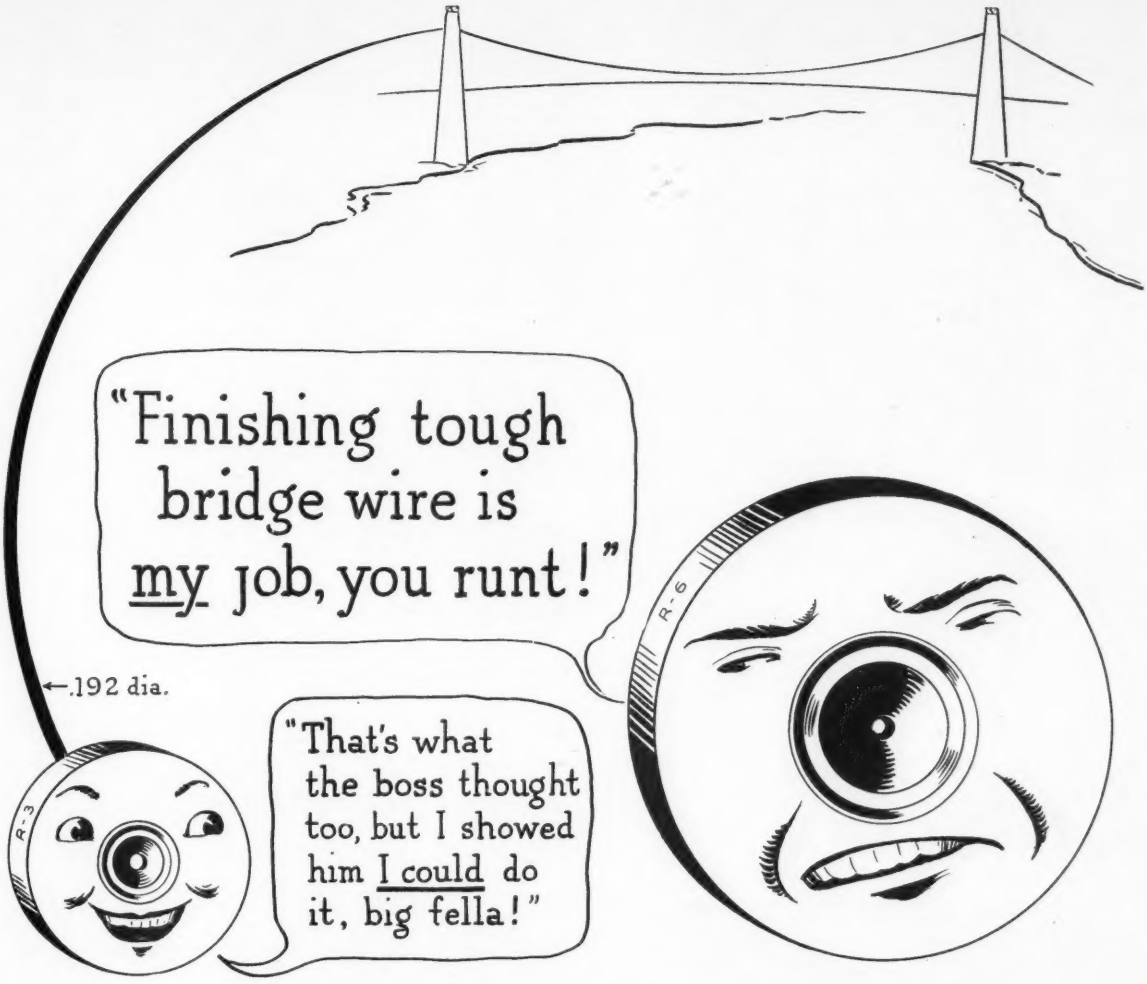
THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - - - - YOUNGSTOWN, OHIO

YOUNGSTOWN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←.192 dia.
"That's what the boss thought too, but I showed him I could do it, big fella!"
R-3
R-6

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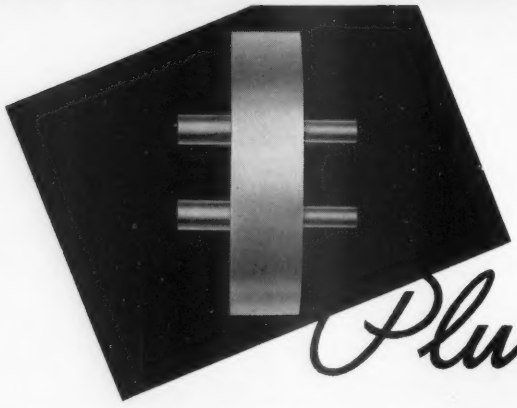

Plus

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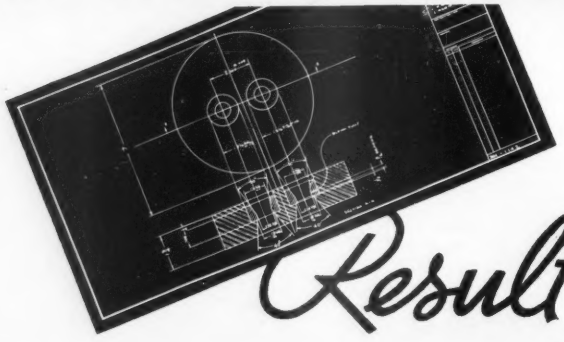

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APRIL: Large implement manufacturer installs two Cyclones. Seven additional units installed during 1935.

MAY: Hoover Company chooses Cyclone for dies. Later states: "Die casting dies tempered in our Cyclone Furnace are of uniform hardness regardless of the size of the load or position in the furnace chamber."

JUNE: Sales increasing rapidly in spite of 30% reduction in competitive prices. Harley-Davidson Motor Company's Cyclone goes into operation. Company reports six months later; "Our Cyclone turns out the work at a surprisingly rapid rate, and careful tests show a perfect uniformity, regardless of the density of the charge. It has been running continuously without any trouble whatever."

JULY: A manufacturer of temperature control equipment tests the Cyclone for the application of calibrating thermostats. Reports uniformity in heating of plus or minus 0.3° F.

AUGUST: Standard Steel Treating Company orders Cyclone and later reports: "We find our Cyclone to be as accurate as a fine watch. We are meeting, with ease, specifications of our most particular customers."

SEPTEMBER: Exhibit of Cyclone Furnaces in actual operation at the Steel Show in Chicago. Heating of dense loads checked constantly with six-point potentiometer. Cyclone the center of interest at the Exposition.

OCTOBER: Widespread success of the Cyclone results in the re-designing of competitive equipment.

NOVEMBER: in spite of a further reduction of 25% in competitive prices, Cyclone sales double the record of any previous month.

DECEMBER: Gas Fired Cyclone Furnace announced. Sales pass the November mark.

JANUARY: 1936 Gas and Electrically Heated Cyclones now in operation in practically every industrial district from New England to Texas. Users enthusiastic without exception.

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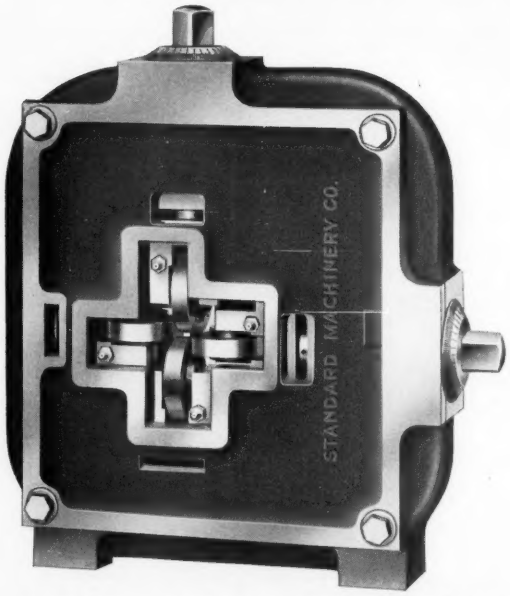

ADJUSTABLE DRAW PLATE—UNIVERSAL

THE Universal Type is so named in comparison with the Plain Type because the opening for the wire can be adjusted to any size within the rated capacity, very quickly, without change of rolls, by simply turning the two square head adjusting screws shown in the cut. The adjustment is such as to obtain any square or flat within the range given. The adjusting screws are provided with graduated dials for maintaining accuracy in the drawn wire. The rolls are mounted on roller bearings, which eliminate heating of the journals and consequent distortion of the material being drawn.

THESE Turks Heads are great labor savers and far superior to any other tool in drawing or rolling square or flat wire. They eliminate entirely the replacement cost on worn dies, of the solid type. They are strong and durable and can be used on steel and iron as well as on the softer metals. Brackets are available for attaching them to wire drawing machines, rolling mills and draw benches. Special sizes are made to order.

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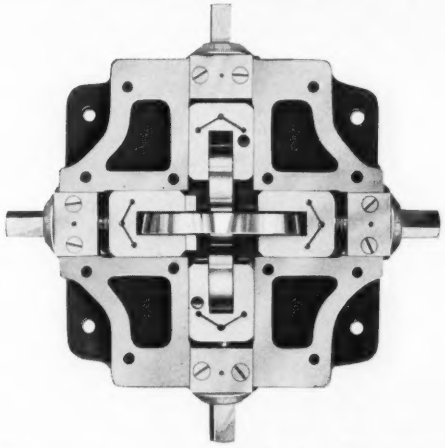
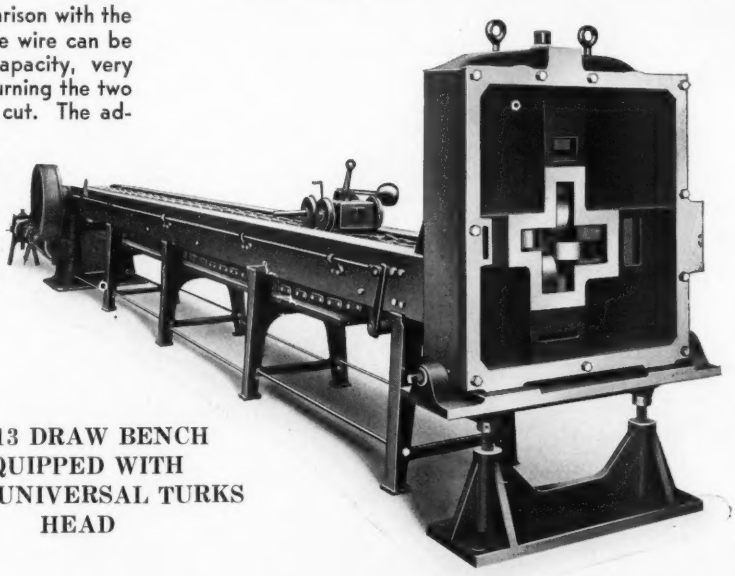
ADJUSTABLE DRAW PLATE—PLAIN TYPE "TURKS HEAD"



THE faces of the rolls on the Plain Type may be formed to suit irregular sections of stock. Also the rolls may be engraved so as to obtain figured designs on the drawn stock such as on the fancy wire used in jewelry or as on the figured tubing used in ornamental brass work.



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No. 403
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No. 409
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No. 461
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No. 464
9 Emery Barb Wire Machines, 2 and 4 point.

No. 465
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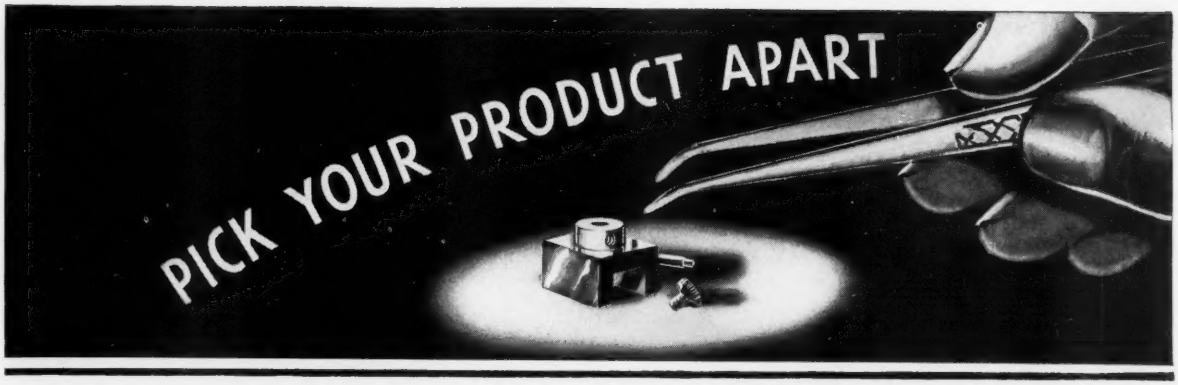

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IT MAY PAY YOU WELL TO CHECK YOUR PRODUCT AGAINST THESE QUESTIONS

1. Do the slides and cams corrode and stick?
2. Do adjustment screws "freeze"?
3. Does salt air shorten the life of certain parts?
4. Do wire cloth strainer units suffer from corrosion or undue wear?
5. Would improved acid resistance be a factor?
6. Or perhaps higher friction resistance?
7. Do the spun or drawn parts show splits and checks?
8. Are the screw machine parts a tough, expensive turning job?
9. Does uneven grain show through the plating?
10. When the plating wears off, does an ugly spot remain?
11. Is it too hard to get an even plate?
12. Does contraction, expansion or deformation affect efficiency?
13. Is it costly to get a high polish for lacquering?
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Seymour Nickel Silver wire has extensive application for the manufacture of springs, trimmings, formed parts, etc., and its fine ductility permits redrawing to the smallest gauges.

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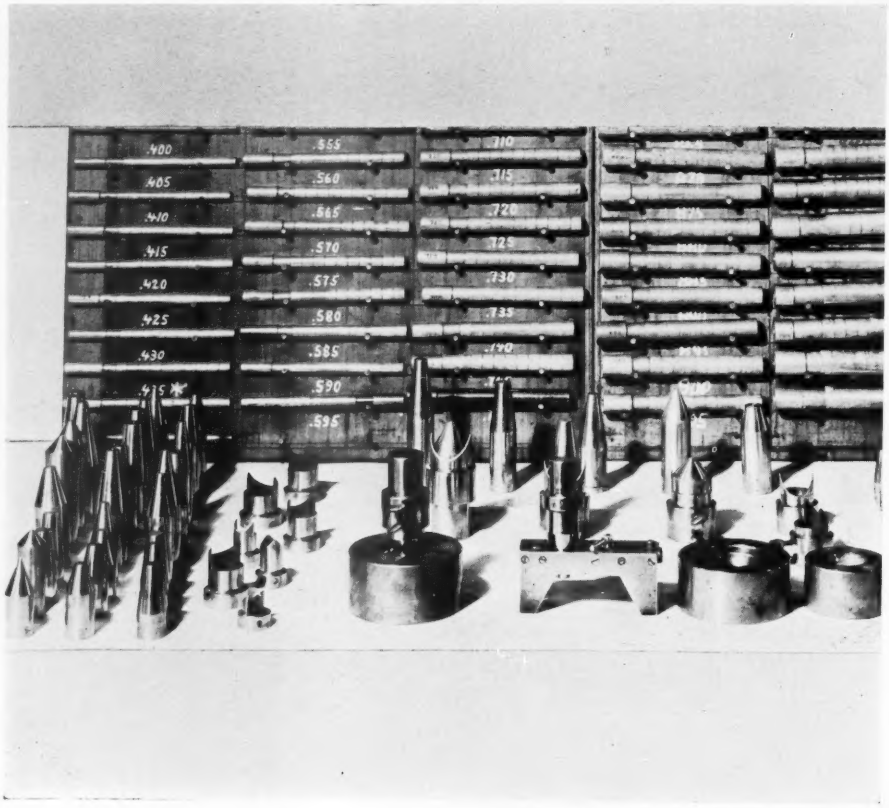

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip Wire Products and Insulated Wire and Cable

DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. II February 1936 No. 2

Designated as

Official Publication By The Wire Association

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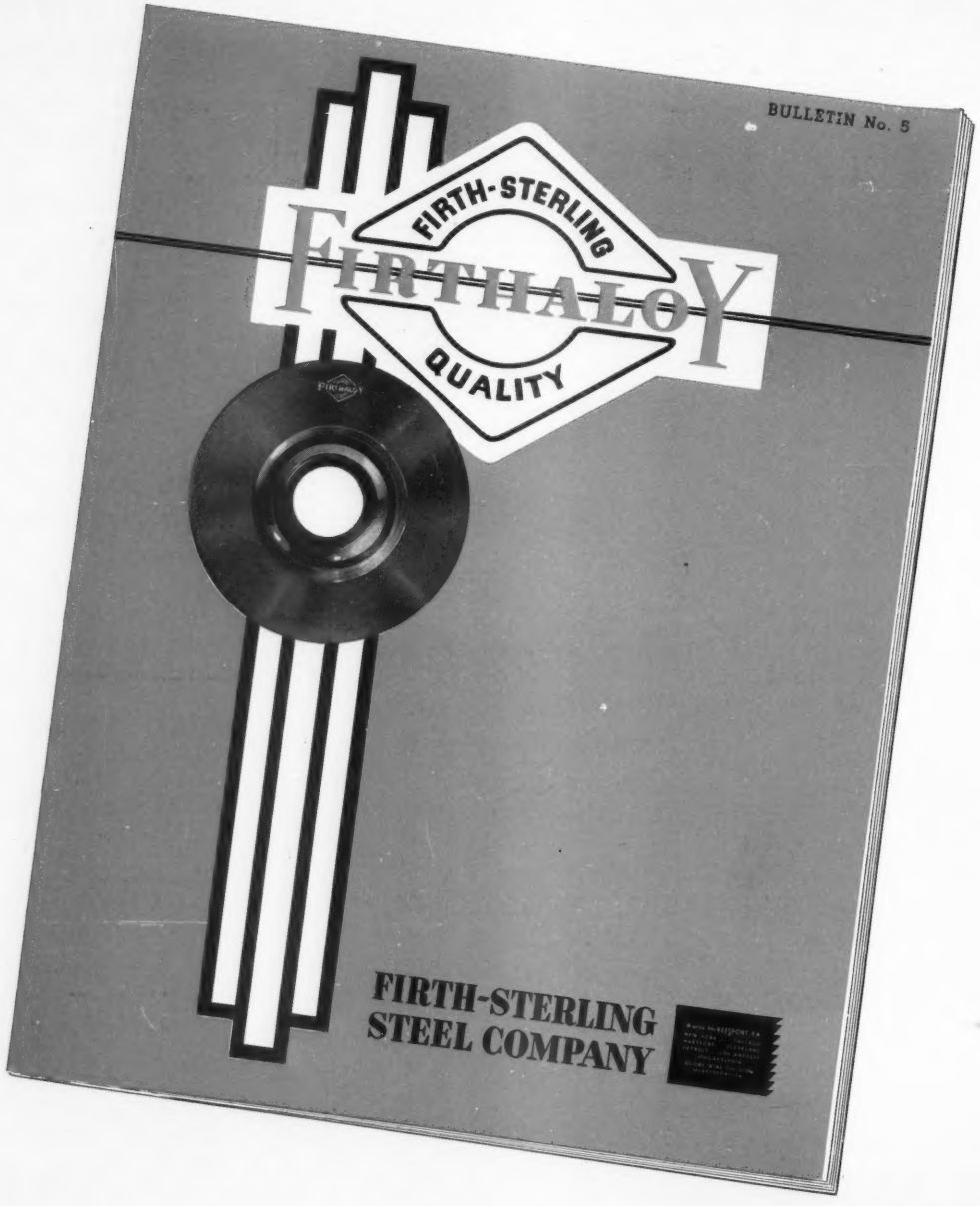

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING --- ROLLING--- EXTRUDING --- FORMING --- FABRICATING

Vol. 11 FEBRUARY 1936 No. 2

Aluminum Wire Its Manufacture And Uses

By R. T. Griebling,
Aluminum Co. of America, Pittsburgh, Pa.

The development of aluminum outlined. Aluminum alloys and their characteristics together with methods of manufacture and uses in rod and wire are here described.

✦ ✦ ✦ ✦

THE first few hundred pounds of aluminum wire, drawn in the United States in the early nineties, were quite insignificant when compared with the millions of pounds now produced annually. Their importance lies in the fact that they initiated the application of aluminum in the electrical industry.

✦ ✦ ✦

THE lightness of aluminum interested electrical engineers in the construction of high voltage transmission lines because it was easily transported and handled. Later on when aluminum cable was reinforced with steel, spans, often thousands of feet long, could be built to carry current for many miles from the source of production to the consumer. Longer spans saved power companies thousands of dollars in transmission line tower costs.

DURING the early years of the aluminum wire industry, by far the greater part of all wire made was used for the transmission of electrical power. Much of the wire made today is still used in the electrical industry, for more than 430,000 miles of aluminum cable, steel reinforced, has been used on transmission lines in the United States alone.

✦ ✦ ✦

ALUMINUM wire was not made before 1893 because the aluminum industry had been in existence for only a few years at that time, and applications of the metal to various uses were made gradually.

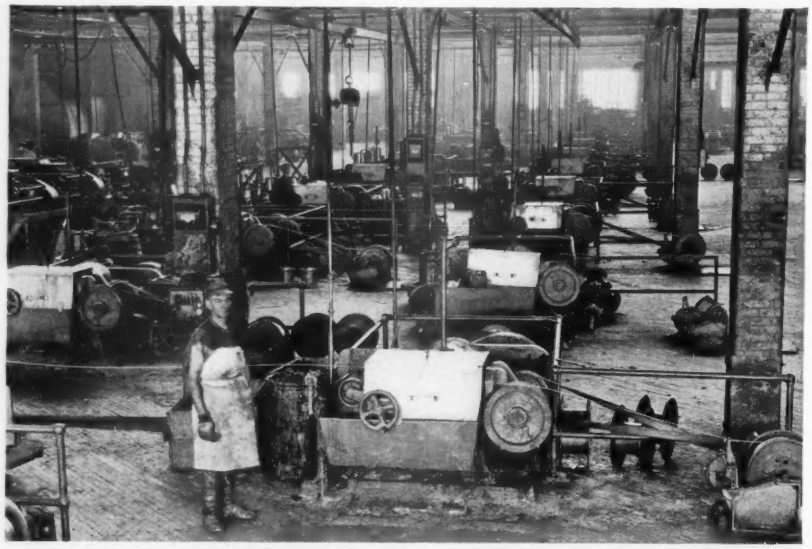
✦ ✦ ✦

ALUMINUM, most abundant metal in the earth's crust, was not always a common commercial metal. For quite some time after it was discovered in 1925, it was classed with the precious metals. The method of making aluminum inexpensively was found by **Charles Martin Hall** just fifty years ago this month.

Rolling of rod for electrical conductor wire prior to drawing. Before the mill at the left are two rod ingots. The piece to the left of the workman has been passed through the mill several times, while the rod to his right is being passed through the mill once more after which it is ready to be further rolled on the succeeding mills at the right of the photograph. After a number of passes the rod becomes so long that it is fed into one mill while issuing from another. This may be seen by the looped rod lying on the floor in the center of the picture. ✦ ✦ ✦ ✦ ✦

Designated as Official Publication by the Wire Association

HALL was a young graduate of Oberlin College with an absorbing interest in chemistry. He was attracted to aluminum by the stubborn manner in which it resisted all attempts at inexpensive reduction. His labors were crowned with success, and aluminum, which had been the metal of the laboratory and the jewelry store, was given the chance to climb to fifth place among metals in point of world tonnage produced and consumed. Among the earliest products made of aluminum after it had attained its new position in the family of metals, aluminum wire must be listed.



Battery of sleeve-type continuous wire drawing machines. These machines reduce the diameter of the wire by drawing it to the required sizes.

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HIGH-PURITY aluminum wire is admirably suited for electrical conductors. Suitable strong aluminum alloys have been developed in order to give the metal sufficient strength to be used in many other applications.

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THE wrought aluminum alloys fall into two general classes: (1) those which acquire their properties through strain-hardening or cold working; and (2) those which attain their properties through heat-treatment. Until the invention of duralumin, the first of the heat-treatable alloys of aluminum, containing copper, magnesium and manganese, wire was made from aluminum alloyed with zinc and manganese, and the physical properties were further increased by cold working. The unheat-treated alloys find application in many fields, but where higher mechanical properties are desired, heat-treated alloys are generally used. The aluminum alloys available today in wire form, and their mechanical properties, are listed in Table 1. The alloy nomenclature is that used by the Aluminum Company of America.

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Making Aluminum Wire

IN the aluminum industry, wire is distinguished from rod and bar by an arbitrary size limit. Whether they be round, square, hexagonal, or rectangular, sections in which the maximum diameter does not exceed ⅜ in., are classed as wire. Round edge rectangles made by flattening wire and termed "flattened wire," include thicknesses from .010 in. to .1875 in., and widths from .030 in. to 2 in. Sizes larger than these fall into rod and bar classifications.

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Drawing

DRAWING usually begins with a rod which has been produced by rolling from wire ingots. Inasmuch as different fabricating practices are required from different alloys, it is only possible, in a paper of this length, to touch in general upon the methods of fabrication as applicable to all aluminum alloys.

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Dies

DIES for round wire vary; they depend upon the wire size and finish desired. Where neither close dimensional control nor superior finish is required, such as is the case in many larger sizes, chilled cast iron or alloy steel dies are satisfactory. Tungsten-carbide dies are used where better control or finish is demanded. For very small sizes, diamond dies may be employed. Die design is broadly similar to that used for copper.

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Lubricants

LUBRICATION is necessary in any type of forming, whether it be spinning, extruding, drawing, forging, or rolling. It is even more important in the drawing of aluminum, as the coefficient of friction of aluminum in contact with iron or steel is higher than that of many other metals. Most satisfactory for this type of work is a lubricant having a grease or tallow base.

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Reductions During Drawing

REDUCTIONS during drawing depend upon the alloy. Hard drawn wire can be obtained in various alloys in a range running from a 60-per cent to a 95-per cent reduction after annealing. Both of these limits are exceptional, but have been included to show the wide range possible. An average reduction of between 75 per cent and 85 per cent is considered normal to produce the properties specified for the hard temper.

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Removal of Strain Hardening

THE effects of strain-hardening are removed by heating aluminum and most of its alloys to a temperature of 650 deg. F. The aluminum-manganese alloy 3S should be heated to a temperature around 750 deg. F. for complete softening. The heat-treatable alloys must not be heated to too high a temperature or partial heat-treatment will result. The annealing temperature for these alloys is

TABLE 1—TYPICAL PROPERTIES OF ALUMINUM ALLOY WIRE

Alloy*	Composition	Yield Strength (lb. per sq. in.)	Ultimate Strength (lb. per sq. in.)	Elongation (per cent in 4D**)
2S-O	Aluminum	4,000	13,000	45
2S-H	Aluminum	21,000	24,000	15
3S-O	Aluminum, Manganese	5,000	16,000	40
3S-H	Aluminum, Manganese	25,000	29,000	10
17S-O	Aluminum, Copper, Manganese, Magnesium	10,000	26,000	22
17S-T	Aluminum, Copper, Manganese, Magnesium	35,000	58,000	22
17S-RT	Aluminum, Copper, Manganese, Magnesium	46,000	61,000	13
24S-O	Aluminum, Copper, Magnesium	8,000	22,000	27
A17S-T	Aluminum, Copper, Magnesium	24,000	43,000	27
A17S-O	Aluminum, Copper, Manganese, Magnesium	10,000	26,000	22
24S-T	Aluminum, Copper, Manganese, Magnesium	43,000	65,000	22
51S-O	Aluminum, Silicon, Magnesium	6,000	16,000	35
51S-W	Aluminum, Silicon, Magnesium	20,000	35,000	30
51S-T	Aluminum, Silicon, Magnesium	38,000	48,000	16
52S-O	Aluminum, Magnesium, Chromium	14,000	29,000	30
52S-H	Aluminum, Magnesium, Chromium	36,000	41,000	8
X56S-H	Aluminum, Magnesium	58,000	62,000	4

(*) The symbols for the various wrought alloys are:
O—dead soft temper. H—hard temper. T—heat-treated, quenched and aged. X—experimental alloy.
W—alloy has been given solution heat-treatment, but has not been aged at elevated temperatures.
F—strain-hardening after heat-treating. (*) D—diameter.
The composition and/or heat-treatment of many of these alloys are patented.

usually maintained in the range between 650 to 670 deg. F. In some cases it may be necessary to use a more complicated annealing procedure to remove heat-treatment effects in the rod which have resulted from the hot-rolling operation. This involves heating the rod at a temperature of 850 deg. F. and then cooling it slowly till a temperature of 400 deg. F. is reached, after which the cooling rate is without effect.

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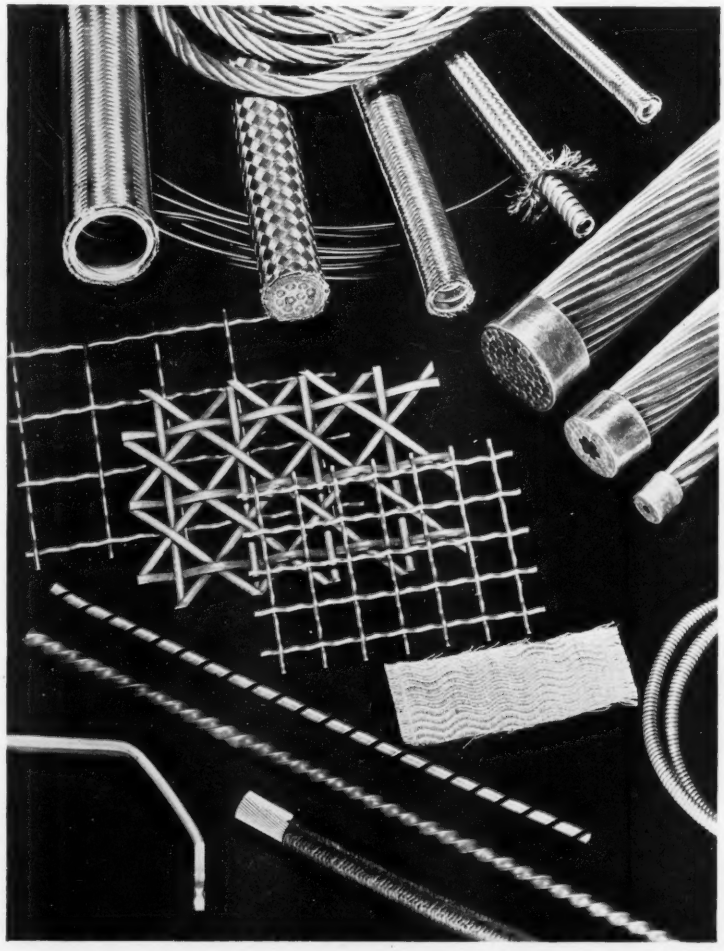
Square Wire Is Drawn On "Turks Head"

SQUARE wire is drawn from round wire by first giving the round wire a pass on a Turks head to a rough oversize square shape. Further drawing brings the wire to the finished size. These are the only two operations which differ from the drawing of round wire.



A number of products showing the use of aluminum wire. Various types of aluminum cable, steel reinforced, aluminum wire mesh, cable with aluminum braided covers, aluminum rope, aluminum wire insulated by means of the Alumilite process, cloth filigreed with aluminum wire and automatic pencil spirals. ✦ ✦ ✦ ✦

✦ ✦ ✦

DEPENDING upon the finished size, flat wire is rolled from either round or rectangular stock. As the reduction is in one dimension only, the flattening passes must depend upon the final ratio of the width to the thickness and the alloy used. There is a considerable difference in the behavior of different alloys in similar cross-sections.

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Commercial Markets

THE electrical industry, first to make use of aluminum wire, still accounts for a substantial tonnage. As an example of the im-

(*Please turn to page 106*)

Some Recent Developments In Tungsten Die Practice

By James R. Longwell,
Engineer, Carboloy Co., Inc., Detroit, Mich.

An outline of the improvements in practice resulting from a wider knowledge of tungsten carbide dies developed through practice and research during the year 1935. ✦ ✦ ✦ ✦

IT has been pointed out in these pages many times that wire is one of the oldest and most used forms into which metals are worked. The various stages through which the wire mills have passed have been described and illustrated and it has been easy to visualize the progress from the crude methods of the mills one hundred years ago to the more modern methods in use today. Control was developed as the art progressed and the laboratory became an important part of the routine work of betterment.

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THIS past year the Wire Association prize for the best paper was presented to Mr. McCarty for his thorough and helpful work on the subject of grain size control. Such work as was covered by this paper is of great value to the industry. Other scientific work of importance to the wire industry has been carried on for years and has resulted in improvements in the finished product. Laboratory facilities are considered an essential part of a wire mill to guide the operating department in laying out the proper drafts, heat treating specifications and in making physical checks on the properties of the wire as shipped.

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ALL of these detailed laboratory controls are important. Yet a great many wire mill foremen will tell you that "good wire is made in the cleaning house and the first hole." If this is true—and there must be a great deal of truth in it or you would not find so many experienced mill men stating it—it does not seem out of place to ask why there is so little emphasis placed on these important points in the laboratory work? Following up this question with some inquiries and investigation, we have found that there has been more than a passing emphasis placed on these questions in only a few mills. These mills have recognized the fact that no matter how carefully they adjust their drafting practice to the material being drawn, the frictional resistance to drawing the wire depends largely upon the nature of the substances forming the two surfaces in contact, the smoothness of these surfaces and the presence or absence of any lubricant between the surfaces, and that the control of the smoothness of the surfaces and the lubricant between the surfaces lies primarily in the cleaning house. You will find here, therefore, that some improvements in cleaning house practices have been made which are reflected in the finished product of the mills. During the past year and a half there has been a marked improvement in the results obtained from tungsten carbide dies in those mills where cleaning house practices have been the subject of laboratory investigation. These results have amounted to as much as eight times the production per hole size which they obtained with their former practices. This big improvement has come about solely through the improvement made in the cleaning house practices.

J. R. LONGWELL,
Engineer, The Carboloy Company, Inc.
Member Wire Association.

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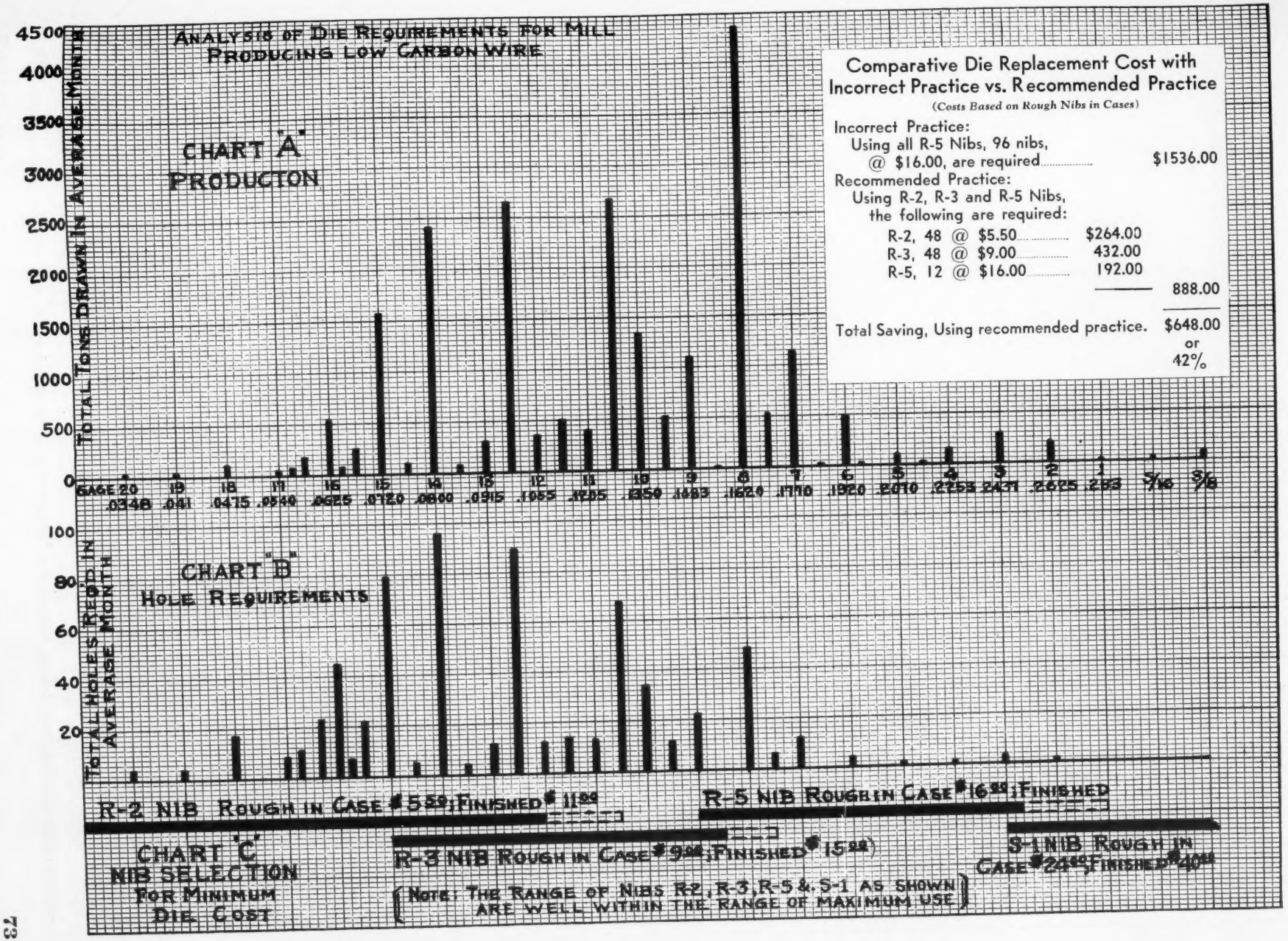
SINCE the advent of the Carboloy die, many mills have spent thousands of dollars for these dies. The die is practically the only tool used in the wire mill and it is this tool that the mill uses to produce a product of high quality. There have been a few mills where the expenditure for carbide dies was accompanied by the assignment of an experienced and responsible person to the application, care and use of the dies in the mill. Three or four years ago when the installation of Carboloy dies was rapidly gaining headway, this assignment of a responsible die supervisor occurred very rarely outside of mills where dies had previously been recognized as important and had been subject to continuous investigation


ANALYSIS OF DIE REQUIREMENTS FOR MILL PRODUCING LOW CARBON WIRE
CHART "A" PRODUCTON
TOTAL TONS DRAWN IN AVERAGE MONTH
4500
4000
3500
3000
2500
2000
1500
1000
500
0
GAGE 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 3/16 3/8
.0348 .041 .0475 .0540 .0625 .0720 .0800 .0915 .1055 .1205 .1350 .1483 .1620 .1770 .1920 .2070 .2253 .2437 .2625 .283
CHART "B"
HOLE REQUIREMENTS
TOTAL HOLES REQ'D IN AVERAGE MONTH
100
80
60
40
20
R-2 NIB ROUGH IN CASE $5.50; FINISHED $11.00
R-3 NIB ROUGH IN CASE $9.00; FINISHED $15.00
R-5 NIB ROUGH IN CASE $16.00; FINISHED
S-1 NIB ROUGH IN CASE $24.00; FINISHED $40.00
CHART "C"
NIB SELECTION FOR MINIMUM DIE COST
(NOTE: THE RANGE OF NIBS R-2, R-3, R-5 & S-1 AS SHOWN ARE WELL WITHIN THE RANGE OF MAXIMUM USE)

Comparative Die Replacement Cost with Incorrect Practice vs. Recommended Practice

(Costs Based on Rough Nibs in Cases)

Incorrect Practice:		
Using all R-5 Nibs, 96 nibs, @ $16.00, are required		$1536.00
Recommended Practice:		
Using R-2, R-3 and R-5 Nibs, the following are required:		
R-2, 48 @ $5.50	$264.00	
R-3, 48 @ $9.00	432.00	
R-5, 12 @ $16.00	192.00	
		888.00
Total Saving, Using recommended practice.		$648.00 or 42%

and accurate control. The other mills seemed willing to allow the carbide die installation to be made by outside representatives, and in these mills the operating department made little effort to get the most from the dies. During the past year there has been a very noticeable change in this practice in the mills and many mills have made a determined effort to get the greatest return from their investment in carbide dies. However, it may be safely said that the greatest development recently made in the tungsten carbide die practice has been in the mills recognizing that the problem was theirs and in their setting up to solve it.

✦ ✦ ✦

AT the meeting of the Wire Association in October, 1935, the recognition of this problem was very evident through group discussions which were heard in the various lobbies after the general meetings were over. There was one discussion which was particularly enlightening and during which the superintendent of a mill recognized for its superior product and its extremely low die costs, made the statement that he was enjoying all of the advantages accruing from the use of carbide dies which he had found other mills were enjoying, but that he had in his talks been able to find no one who stated that along with these advantages he had reduced his die cost below that which he had when using the old-fashioned dies; yet he himself had reduced his die cost over $400.00 a month. He was promptly questioned on how he had accomplished this. He replied that he had made a very careful and thorough study of die application, use and care, and that he had set up practices in his die room and in his mill which had paid him handsome returns. He had gone to the extent of machining his die boxes and setting them up on the frames so that they lined up properly with the blocks; he had put stops on the frames and arranged to assemble his die holders in the die boxes in such a manner that the operator or wire drawer could use the die in only one position. He had attached shives to guide the wire into the die on the die axis, and had improved his cleaning house practice and his lubricant. All of this has resulted in fewer men being required in the die room to service and recut dies and in his ability to use smaller dies for drawing wire than he observed were being used in other mills.

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Many Mills Find Use of Smaller Dies Practical

THE second important development which the mills have made in their carbide die practice is the studied use of small die nibs to produce wire in sizes much larger than normally expected. Scarcely three years have passed since a nib approximately .6″ diameter by .6″ high was considered necessary to produce wire from the rod. These nibs were started at small sizes and recut through several sizes. On the way up it was common practice to miss many possible sizes because the production was much greater at some gages than at others. This resulted in an accumulation of dies which had worn over size and were not needed for the larger wire. Accumulations of several hundred dies was not an unusual sight. Today the mills are becoming nib size conscious and are analyzing their requirements as illustrated in Charts A, B and C shown in Figure 1.

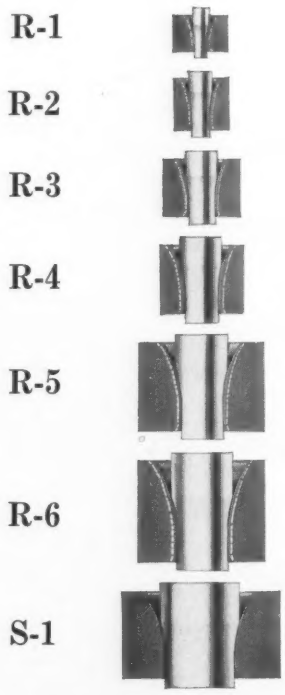

Fig. 2. Standard Carboloy Nibs Most Commonly Used (Actual Size).

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CHART A portrays the first step in an accurate analysis to determine the most economical nib size to use. In this chart the total tons drawn at each size—that is, the total tons of wire processed through a size is added to the total tons of wire finished at this size to make up the tonnage shown in the chart.

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CHART B shows the estimated number of holes required at each size which is obtained by dividing the total tonnage shown in Chart A for that size by the average production per hole in tons.

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CHART C is worked out to show how the various nibs can be used for producing wire at overlapping sizes in order to effect the greatest economies.

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THE comparative sizes of the various dies considered in the analysis shown in Charts A, B and C, are shown in Figure 2. You will note that in the case illustrated there was very little production in sizes smaller than 16 gage or .0625″. There are several mills who have considerable production in these several sizes. For these mills smaller nibs are available as well as a multiple hole die plate containing four, six, nine, twelve or sixteen spots. These die plates are pierced and finished as single hole dies and have been found, through several years of use, to be considerably more economical than single hole dies for sizes smaller than 16 gage. A check-up in the mills has shown the smaller nibs being used at sizes larger than shown in Chart C and that the R-3 die is actually being used to rip rod both in the ferrous and non-ferrous mills although such

practice is well beyond that recommended for the dies.

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An Economical Method of Providing Dies for Shaped Wire

THE third recent development in carbide die practice is just in its infancy. During the past several months there have been more and more instances of wire mill die rooms which had previously confined their work to round hole dies, making odd shaped dies on their regular equipment. This practice was very nicely demonstrated several months ago in one mill where they made several dies for drawing grooved wire. They used their regular equipment and the wire drawn through the dies was satisfactory in every respect. This work was done by making shaped laps and working the round hole die to a shape die. After the shape die had worn off size, it was again recut in the regular manner to a round die. This type of work will undoubtedly be done in an increasing number of die rooms during the coming years. Shape dies have been used for many years for producing hexagonal, square, oval, keystone, commutator and any other shape of bar and wire. These dies have been purchased very largely in the finished state and the reconditioning of the dies has usually been done outside of the mills.

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Tubing Dies

THE producers of ferrous and non-ferrous tubing have rapidly expanded the use of cemented carbide dies during the past year. Dies have been in use for several months producing tubing as large as 2-7/8" in diameter. Mills using these large dies report that they have been able to improve the quality of their product and at the same time reduce the cost of producing.

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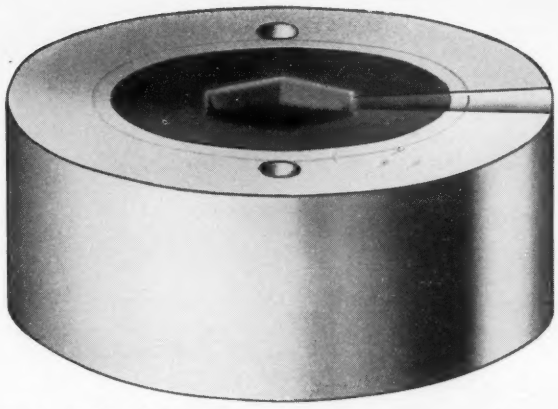

Fig. 3. Nut Burnishing Die.

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Plugs or Mandrels

THE use of plugs or mandrels tipped with cemented carbide has increased during 1935. This increase has been largely confined to the production of special tubing where freedom from scratches on the inside of the tubing is very essential. The more extensive use of carbide mandrels will depend very largely on the solution of the lubrication problem. In those mills where the inside of the tubing is thoroughly lubricated the carbide tipped mandrel has been a success.

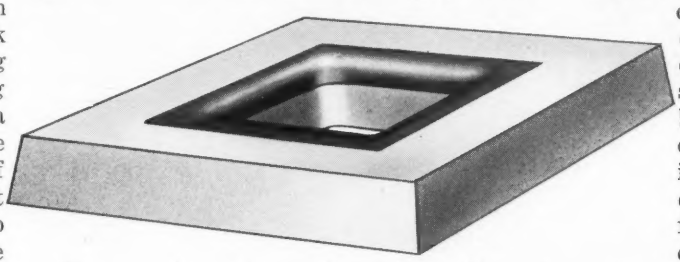

Fig. 4.

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Fig. 5.

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OUTSIDE of the wire industry there has been a continued and rapid increase in the use of cemented carbide dies for drawing, redrawing and sizing sheet metal parts made from steel, brass, bronze, copper, nickel, aluminum and zinc; for burnishing nuts, bolts and pins; for special applications such as sizing and cutting the stream of molten glass, upsetting studs and bolts, cutting off wire, etc.

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DIES for drawing, redrawing and sizing sheet metal parts are used for producing rounds, squares, ovals, hexagons and special shapes where the highest quality of finish is required and the limits for size are small. There have been a good many applications in this field where it has been possible to produce a part entirely free from scratches and exactly on size. This improvement in the quality of the surface finish has in some cases eliminated, and in many cases greatly reduced, the amount of work necessary to finish the piece after it leaves the press. The production per die has been very large, resulting in increased output per man hour and a sizeable reduction in scrap. In several instances the cemented carbide die has made it possible to produce parts which had previously been set aside as impractical with steel dies. Dies for this work have been furnished in rounds up to 1¾" in diameter, and in squares up to 1¼" in diameter. The types of dies more generally in use are shown in the illustrations in Figures No. 4 and 5.

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FIGURE 3 illustrates a nut burnishing die which is used for burnishing cold punched nuts. The use of burnished nuts has increased very rapidly since the plain burnished nut has a

(*Please turn to page 100*)

Drawing Square, Rectangular And Irregular Shapes And Sections

A description of the "Turks Head" now being used to produce square, rectangular and special shaped wire in place of the older method of producing irregular shapes. An adaptation of practice previously more or less confined to the jewelry business. ✦ ✦ ✦ ✦ ✦

IT has been general practice for many years in the various Wire Mills to produce square, rectangular or irregular shapes with the aid of flattening rolls and drawing dies. The metal came from the bullblock as a round shape and then put through a pair of flattening rolls as often as necessary to get nearly the required size and shape. It was then annealed, pickled and taken to a draw bench where it was pulled through one or more dies to bring it down to the required size. The surface of the metal was rarely consistent for the die would load up and scratch. This necessitated removing the die and polishing it with the aid of emery and a polishing machine. Oftentimes the die would wear so that it would exceed the tolerance allowed so that it had to be peened to close the size and then resized to the correct shape.

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WHEN an odd shape had to be made, it required the above operations plus running it through special grooved rolls and drawing through a die or dies.

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IN making the die, it required the service of a skilled operator who used nothing but high grade tool steel. The preliminary steps in making a die are: cut off the die blank from the bar, set it up in a lathe and turn it down to a finished outside diameter and thickness and drill to the approximate confines of the shape. It is then ready for filing which is done at the bench. When a certain shape is ordered in quantities requiring more than one die, a master punch or broaching tool is used. This cuts the time required to make dies. After the die is finished, it is hardened and

Turks Head. ✦ ✦ ✦ ✦

tempered and then lapped out with the aid of fine emery dust to its finished shape and size.

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The Turks Head

DURING the past few years, the use of an adjustable draw plate called a "Turks Head", presumably because of the resemblance of its roll system to the strands of a Turks Head Knot, has found favor more and more with the various mills and is quickly displacing the older method of producing irregular shapes. Although this process of drawing shapes has been known for years, it has been more or less confined to small sizes as found in the jewelry business, where, in addition to drawing irregular shapes, the rolls were engraved so that special designs were transmitted to the wire or tube being drawn.

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THE Adjustable Draw Plate or Turks Head is made up of two styles; the Plain Type and the Universal Type.

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THE Plain Type is so called because the adjustment must be made with four individual square head screws. All four adjusting screws are equipped with graduated dials so that adjustments may be made with the greatest amount of accuracy. The rolls are mounted on ball bearings which eliminated the heating of the journals, thus eliminating any possibility of distorting the metal during process.

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THE principle of the Plain Type Turks Head calls for four hardened rolls highly ground and polished, placed at right angles with each other, and working independently. These rolls can be adjusted either backwards or forwards to the capacity rate of the particular size, so that irregular sections can be shaped.

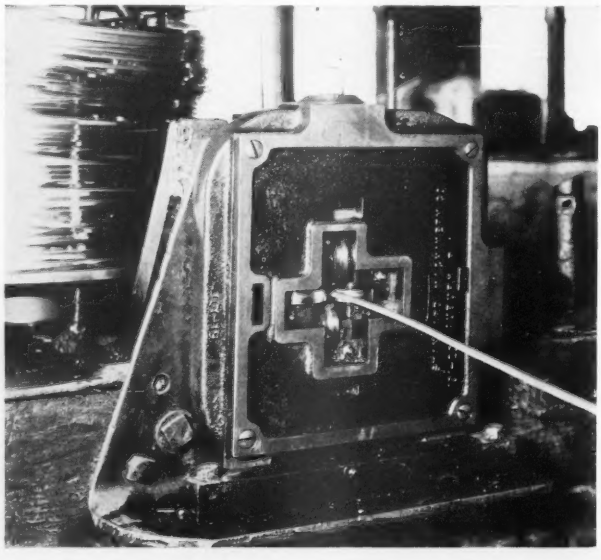

Fig. 1. One form of "Turks Head". Courtesy Seymour Manufacturing Co., Seymour, Conn. ✦ ✦ ✦ ✦ ✦ ✦

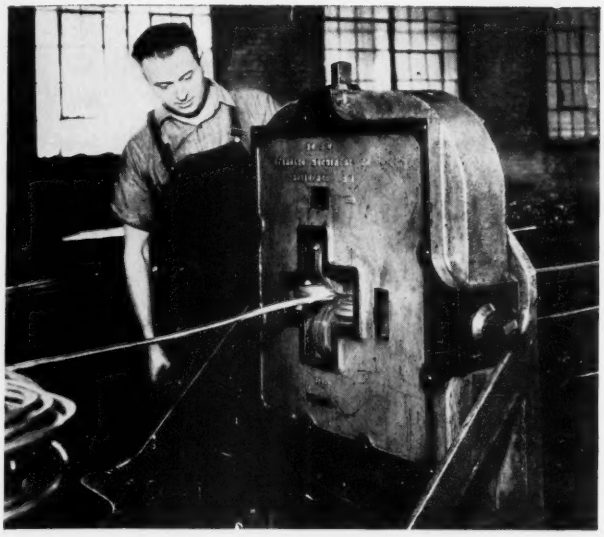

Fig. 2. Another form of "Turks Head" producing shaped wire. Courtesy Seymour Manufacturing Co., Seymour, Conn.

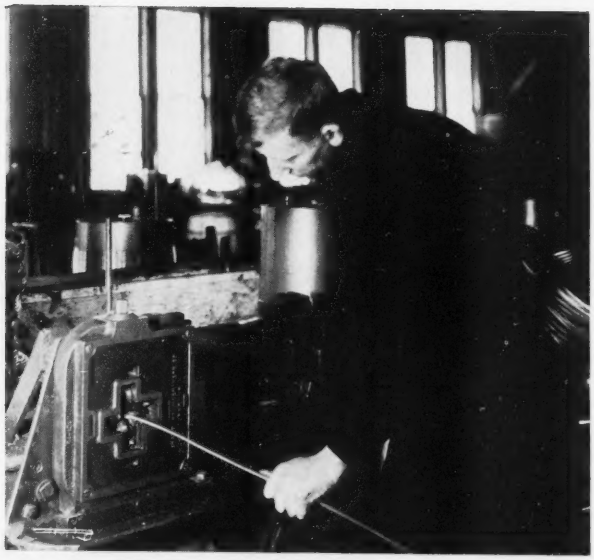

Fig. 3. A small "Turks Head" for producing smaller sections of special or irregular shaped wire. Courtesy Seymour Manufacturing Co., Seymour, Conn.

BY using special shape rolls conforming with the shape desired, any shape may be drawn through the Turks Head, with entire freedom from scratches on the surfaces of the metal in process. As the rolls may be from 1½" diameter to 9" diameter, and revolve as the metal is pulled through, it may be seen that instead of the confined small drawing area necessary in the die process, a drawing area of approximately 4½" to 28" may be had.

✦ ✦ ✦

THE maintenance upkeep on a Turks Head is very small When the surface becomes dull, the rolls can be taken out and ground, then they should be as good as new.

✦ ✦ ✦

THE standard sizes in the Plain Type Turks Head run from ⅛" square to 1" square. Special sizes run to a four inch square which has an 8" diameter and a 4½" face and weighs about two tons.

✦ ✦ ✦

The Adjustable Draw Plate Universal Type Turks Head

THIS type Turks Head is more or less similar to the Plain Type in all respects, only, instead of having four independent adjusting square head screws with graduating dials, it had but two. All adjustments for any shape within the rated capacity of the head can be made by simply turning either or both of the two square head screws.

✦ ✦ ✦

THE standard sizes are from 0 to ¼" square and from ⅛" to 1" square. Special sizes take from 0 to 2¼" square. This has a 9" diameter roll with a 2½" face and weighs about 4100 lbs.

✦ ✦ ✦

THE lubrication used can be the same as for ordinary drawing operations, either hand fed or otherwise.

✦ ✦ ✦

Summary of Some of the Advantages Gained by Using A Turks Head

1. The surface is free from scratches.
2. Due to the graduated dials on the square head screws, accuracy to size is consistent.
3. Eliminating the use of dies and replacements means that the tool charge is less expensive.
4. Less process labor is involved.
5. Does not require constant attention.
6. It is simple and easy to operate and costs very little for upkeep.
7. It can be adjusted to any size within the machine's capacity.
8. It can be easily adapted to various machines.
9. It can be used with the aid of special rolls on almost any shape of wire.
10. It saves time and money waiting for dies.

✦ ✦ ✦

Make Your Plans Now to Attend
The Annual Wire Association Meeting and Convention
To Be Held in Association With The
National Metal Congress
At Cleveland, Ohio October 19th to 23rd, 1936

Barbed Wire

By C. M. Vandeburg
Dallas, Texas

A digest of the history and development of barbed wire and its economic and political effects during the time of its early development. ✦ ✦ ✦

MANY a mother, engaged in patching seats of small torn trousers, has called down maledictions upon the head of the hapless gentleman (?) who invented barbed wire, not suspecting that the poor man thought up barbed wire in self-defense.

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DURING the Civil War, a German resident of Austin, Texas, whose name, unlike his achievement, does not remain to posterity, built a barbed wire fence around his orchard to keep cows out of his precinct. This fence he fashioned from two strands of smooth wire with sharpened nails caught firmly between its twisted strands. Although this doubtless was the first barbed wire fence ever built in the United States, citizens of Austin failed to appreciate this evidence of a new era, and threatened to run the inventor out of town unless he tore the fence down. Hints of mob violence convinced the luckless man that a plain plank fence would retard bovine appetites just as well.

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IN spite of early evidences of unappreciation, however, barbed wire managed to prick the public consciousness and to contribute to the development of law and order in Texas.

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How Gates Demonstrated Barbed Wire

WHEN John Gates, who made a fortune selling barbed wire to Texas cattle kings, arrived in San Antonio, he set up a corral in the plaza and drove twenty-five steers within the enclosure. Cattlemen of that day did not believe that such a flimsy impediment could hold Texas longhorns. But after the steers angrily charged the fence a few times, they retreated, torn, bleeding and subdued, into a huddle in the middle of the pen.

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TEXAS after that took barbed wire to its heart, and barbed wire has formed a large percentage of the hardware shipments which have made Dallas the third city in the United States in distribution of hardware and farm implements direct to users.

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Early Patentees

ON June 25, 1867, the first patent in the United States on barbed wire was issued to L. B. Smith of Ohio. Like many holders of patents, however, Smith was ahead of his time, and failed to cash in on his invention.

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A few years later, in 1874, three men obtained patents on barbed wire, and all three lived in DeKalb, Illinois. These men, J. F. Glidden, Isaac L. Ellwood and Jacob Haish, began the manufacture of barbed wire on a very small scale, increasing the output gradually until it grew into a prospering enterprise.

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THE founder of Amarillo, H. B. Sanborn, brought the first spool of barbed wire into Texas. This he sold in Gainesville in 1875. At Austin a little later he sold a carload, paving the way for the enterprising salesmanship of John W. Gates, who later became one of the founders of The Texas Petroleum Company.

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Political and Economic Effects of Barbed Wire

TO modern ruralists, accustomed to fences defining their property, it is inconceivable that the erection of barbed wire fences brought bloodshed. But to the early Texan, accustomed to regard water and grass as free as air, fences were instruments of the devil, and were cut down as fast as they were put up.

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BY 1883, barbed wire was a pertinent political and economic issue. The tangible evidence of the transition from old to new, it was the vulnerable spot upon which was wreaked the wrath of squeezed-out landowners. Immigrants to Texas had not discovered that Texas is underlaid with a great fresh-water sea of artesian water, and as a consequence they settled near running water. When a man was cut off from his existing source of fresh water, there was bound to be trouble.

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DESPITE the fact that for years some hardware dealers refused to stock the new-fangled fence material on the grounds that it was cruel and barbarous, or that it was too flimsy, its use spread like wildfire in Texas. Strength, durability and cheapness were the selling points upon which John Gates made his bid for fortune and fenced in Texas. Plank fences were too expensive and too laborious to build, and in addition, they very soon had to be replaced.

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IN the 1880's livestock producers in Texas began to become "breed conscious" and yearned to improve their stock. In East Texas, razor-back hogs, which had run loose for years but never fattened, were replaced by Berkshires and Poland Chinas. Shropshire rams were introduced into Texas by Dr. P. W. Kittrell about the same time, and cattle breeders felt urged to replace the native Texas longhorn with cattle of more beef and less brawn. Only by building fences which would segregate the improved stock could livestock producers keep their strains pure and at the same time keep track of the results of their enterprise.

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MANY of the fence cutters took the stand that the famous Texas longhorns were the only cattle for Texas, and were incensed by the introduction of newfangled beef. In 1884, it was necessary for Governor Ireland to call a special session of the Legislature to adopt regulatory measures in order to arrest the wire-cutting epidemic. A law was passed making fence-cutting a felony, and a land owner felt justified in taking a pot-shot at any fence-slasher. The art of wire-slashing declined, and by 1885, white settlement in Texas had advanced farther than in the fifty years preceding. Thus barbed wire proved itself an agent of civilization by providing a cheap fencing for the prairies of the West.

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BARBED wire closed the ranges forever to wandering Indian tribes. To wire fences and the Rangers were attributed credit for solving the Indian problem in Texas, for the poor Redskin, with eyes accustomed to far horizons, could not find his way across the prairies through the maze of fences which deterred his straight sure path.

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FENCES were the direct cause for another improvement in the Texas livestock industry, for inaccessibility of running water forced the cattleman to bore wells, build tanks, and erect windmills. Barbed wire fences established the owner's right to sole use of his improvements. Cattlemen had discovered that it costs as much to produce hooves, horns and brawn as it did to produce edible beef, and Texas breeders concentrated on the Hereford, the Durham, Shorthorn, the Polled-Angus and the Brahma. Because of barbed wire and the consequent segregation of stock, Texas was able to produce what no other State has evolved—a breed of cattle which is strictly different from any other.

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THIS breed, the Santa Gertrudis, was developed on the Santa Gertrudis unit of the King Ranch, largest ranch in the world. It is three-eighths Brahma and five-eighths Shorthorn, and has retained the best balance between the beef qualities of the Shorthorn and the hardiness of the Brahma.

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1500 Miles of Barbed Wire on a Single Ranch

ON the Santa Gertrudis Ranch alone are 1500 miles of barbed wire fence strung through mesquite and cedar posts by a scientific method. Not a nail or staple is to be found in the Santa Gertrudis fence, since the galvanized wire is strung through holes in the posts to prevent the ravages of rust. Santa Gertrudis fence costs $375.00 a mile, which accounts for some of the profit from hardware in Texas.

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Effect on Cattle Business in Texas

BLIZZARDS which caught starving cattle in drift fences encouraged the cattleman to divide his herds into smaller units and to provide winter food and shelter. Barbed wire thus engendered the development of the modern improved stock farm.

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FARMERS who fenced in their crops passed the death sentence upon one romantic phase of the cattle industry: The cattle trails. Cattle driving continued after railroads were built, for it was cheaper to drive than to ship, until fences closed up the trails. With the closing of trails, beef producers turned their attention to home market. Barbed wire had much to do with the establishment of the present packing industry in Fort Worth.

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CATTLE thieving was much more difficult after the introduction of wire fences. If a thief cut the fence, his general direction was established and he was comparatively easy to apprehend.

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ALTHOUGH barbed wire consumption was considerably accelerated during the World War, when it was employed to confound and annoy the enemy, it has in general been the agent of peace and civilized development. The significance of its usefulness was emphasized by a recent statement of a Janesville, Wisconsin, manufacturer, who refused to sell it to European combatants on the grounds that barbed wire was made only to keep "American cows where they belong."

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The Texas Centennial Exposition of 1936

DALLAS, scene of the Texas Centennial Exposition which opens on June 6 to celebrate the Lone Star State's first hundred years of independence, has for 49 years held a State Fair which grew to be the largest state fair in America. As much as 75 per cent of the fair's annual revenue has in years past been derived from exhibits of hardware and farm implements.

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FARM implements will again form a significant part of the exhibits which will be housed in the Hall of Livestock and Animal Husbandry at the Exposition. But more significant will be the exhibits which have been made possible because of the introduction of barbed wire into Texas: Improved herds of cattle, sheep, and hogs, and agricultural exhibits, which will substantiate Texas' claim to agricultural preeminence.

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The Lindberg Cyclone Tempering Furnace

ELECTRICALLY or gas heated air in huge volume and under high pressure and velocity is the outstanding feature of the Lindberg Cyclone Tempering Furnace, introduced early in 1935. Dense loads of screws, bolts, springs, etc., are heated as quickly and uniformly as the more open type of work, such as tools, gears, or machine parts.

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THE close temperature uniformity obtainable is illustrated by an installation for calibrating sensitive thermostats, specifications for which call for a uniformity throughout the work chamber of plus or minus 1°F. The user reports obtaining a uniformity of plus or minus 0.3°F.

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Construction of Unit

THE outline drawing shown illustrates the details of construction of the electric unit. The material to be heated is placed in a cylindrical container, having solid sides and a perforated bottom. This container is placed in the work chamber of the furnace, which is lined with an alloy casting at the top, which takes the shock of loading, and a rolled alloy liner below. The fan and elements are enclosed in the heating chamber away from any accidental contact with the charge. The fan is of the pressure blower type, which forces the air up through the elements, into the circular cast duct at the top of the work chamber, down through the charge, and back into the fan. As the work container is sealed at the bottom all air must pass entirely through the charge. When a dense charge is being heated, a pressure is built up above the charge, and a partial vacuum is created below resulting in increased velocity of the air travel.

THE use of the horizontal blower type fan makes it possible to support the fan on short centered, air-cooled ball bearings. A standard horizontal motor is mounted at the side of the furnace, away from the heat and accessible for maintenance.

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THE heating elements are of an improved construction. They consist of coils of 80% nickel—20% chromium wire supported by refractory spools. An important feature of this construction is that the portion of the element which goes over each spool is in straight form instead of coils, thereby eliminating pockets for collecting dirt scale and soot. The success of this construction has resulted in its installation in many older types of air tempering furnaces.

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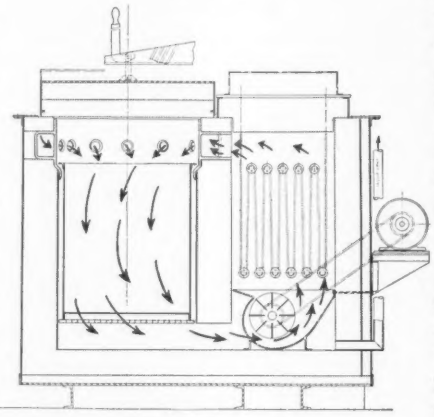

PLACING the fan and element in a separate protected chamber, supporting the fan on close centered ball bearings, using a standard horizontal type motor away from the heat of the fan shaft and accessible for maintenance, has all contributed to the elimination of production delays. A further insurance against maintenance delays is the method of mounting the element. It is suspended from the top of the heating chamber, and can be removed and replaced in three minutes time without cooling the furnace or disturbing the charge.

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RUGGEDNESS in a furnace is of course important, but temperature uniformity and accurate temperature control is the first consideration. Due to the fact that tempering is done at comparatively low temperatures, convection heating is required, which follows entirely different laws than radiant heating which is employed at the higher temperatures.

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Convection Heating

CONVECTION heating consists of transferring heat units by means of a gas, usually air, from the heating medium to the material to be heated. Any interference with the movement of the air or gas interferes with the heating. Convection heat will not penetrate a solid where radiant heat penetrates with comparative ease by conduction through the solid and radiation again from the opposite surface.

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A SIMPLE comparison between the two types of heating is to say that convection heat follows the laws of air flow; radiant heat follows the law of light—it can be focused, reflected, and will travel thru vacuum.

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OBVIOUSLY, therefore, tempering equipment must be designed with this important factor in mind, that uniform heating will occur where uniform air flow is obtained, and rapid heating will occur where large amounts of air are passing the material to be heated at a rapid rate.

IF the work to be heated is in a dense mass, the air will take the shortest and easiest path if permitted, and heat will be supplied only along this path. The simple remedy in such a case is to force such a large quantity of air thru the charge that it will require the use of every opening, regardless of size, to permit its passage, and still leave some air unable to get thru—which excess air builds up a pressure above the charge.

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IN the Cyclone furnace, developed to obtain these conditions, the powerful pressure blower fan not only applies a pressure above the charge, but sets up a partial vacuum below the charge. Obviously no opening in the charge can be so small or so remote as not to receive its share of the air flow.

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DUE to the fact that convection and radiant heating act in entirely different ways it is necessary where close control is important that the furnace be designed for one or the other, **never** for both.

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IF, for example, we should heat the outside of a basket of work with radiant heating elements and the center by convection heat, we might be able to cause the two to heat uniformly at one definite temperature and with one type of charge, but very decided variables would occur at other temperatures and with other charges.

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A DENSE charge, for instance, would slow up the air flow, retarding the heating of the center of the charge. The reduced air flow thru the elements would cause them to increase in temperature and, therefore, increase the rate of heating by radiation. The Cyclone furnace was therefore designed to eliminate radiant heating from the elements.

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Temperature Control

THE problem of accurate temperature control is entirely distinct from that of temperature uniformity. A furnace may have perfect uniformity and poor control or vice versa. Temperature control at low temperatures has been difficult in the past because of overshooting due to thermocouple lag. This is particularly serious when the heating rate is greatly in excess of the heat requirements, as for example at the end of the heating cycle.

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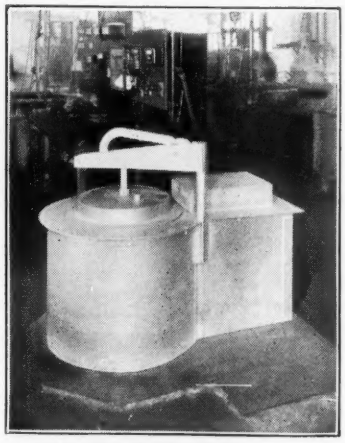
STANDARD equipment on the Cyclone furnace is the Automatic Lindberg Control, which balances the rate of heating with the varying heat requirements. Obvi-



ously, if the heat input exactly equals the heat outgo, a straight line temperature is obtained. The elements of an electric furnace, or the burners of a fuel furnace, are set for maximum heat release. If this maximum rate is applied at a time when only a small percentage of maximum is required, the temperature rises very rapidly, and by the time the control couple shuts off the heat, an excess has been released resulting in overshooting. This overshooting is particularly severe in the case of fuel fired furnaces where thermocouple lag is excessive due to protecting tubes. The Lindberg Control, by reducing the rate of heating to approximately the rate of absorption, eliminates these wide temperature swings.

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THIS instrument accomplishes a second very important function, in that it gives the operator a definite indication as to when his charge is completely heated. As the heating progresses the heating rate continues to reduce until it reaches approximately 10% on the scale at which point it remains fixed. Obviously, this is the standby losses of the furnace and on the following charges the operator knows that when the indicator reaches this point the charge has ceased to absorbed heat and is, therefore, up to temperature.

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THE Lindberg Cyclone Furnace provides ruggedness, elimination of serious production delays, uniformity, and accurate temperature control together with positive indication as to when the charge is thoroughly heated.

STEEL WIRE

By MAURICE BONZEL

THIS complete treatise on every phase of the manufacture of high and low carbon steel and ferrous alloy wires now available in English, in a limited edition . . . The author, trained as a metallurgist, is general manager of a large wire mill in France. He has taken full advantage of his unique opportunities.

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SEND ORDERS TO

WIRE and WIRE PRODUCTS

17 E. 42nd Street, New York

The Wire And Wire Goods Industry In Canada

THIS report by the Canadian Department of Trade and Commerce presents statistics for the Wire and Wire Goods Industry which is a part of the iron and steel group and covers all establishments in Canada that were engaged chiefly in drawing iron and steel wire or in fabricating products from wire of iron or steel.

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IN 1934, there were 69 factories in this industry distributed by provinces as follows:—Ontario, 41; Quebec, 15; British Columbia, 9; New Brunswick, 2; Nova Scotia, 1; and Manitoba, 1. In 1933 a total of 72 establishments reported in this group.

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THE average number of employees in 1934 was 3,163 of which 2,011 worked in plants in Ontario and 736 in Quebec. The 459 salaried employees were paid $835,826 during the year and the 2,704 wage-earners were paid $2,436,914, a total of $3,272,740 for salaries and wages. In 1933 the number of employees was 2,724 and salaries and wages amounted to $2,678,413.

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CAPITAL employed in 1934 was reported at $28,818,082 of which $20,784,398 represented the present value of lands, buildings and machinery, and $8,033,684 the value of working capital such as inventories, cash, bills and accounts receivable, etc. Nearly 64 per cent of this investment was in establishments in Ontario. In the previous year, 1933, the capital employed was given at $28,667,338.

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FACTORY sales in 1934 were valued at $14,684,561 including plain and galvanized wire, barbed wire, wire fencing, wire nails, screws, wire cloth, wire rope, bale ties and such commodities. In 1933 the factory sales were reported at $10,511,900 and in 1932 at $10,407,213.

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THE 14 wire-drawing plants which operated in 1934 employed 2,174 workers to make goods valued at $10,368,401, and the 55 establishments which were engaged only in fabricating wire goods employed 989 persons and made products worth $4,316,160.

IMPORTS of wire and wire goods of iron and steel amounted to $2,230,081 in 1934, and exports were appraised at $2,610,106.

TABLE 1

Principal Statistics of the Wire and Wire Goods Industry—1932-1934

Years	No. of plants	Capital Employed	Average number of employees	Salaries and wages	Cost of purchased materials at works	Selling value of products at works	Value added by manufacturing
		$		$	$	$	$
1932	71	26,593,675	2,923	2,913,312	3,591,238	10,407,213	6,815,975
1933	72	28,667,338	2,724	2,678,413	3,332,040	10,511,900	7,179,860
1934	69	28,818,082	3,163	3,272,740	4,526,426	14,684,561	10,158,135

TABLE 2

Principal Statistics, By Sub-Groups, 1933 and 1934

Years	No. of plants	Capital Employed	Average number of employees	Salaries and wages	Cost of purchased materials at works	Selling value of products at works	Value added by manufacturing
1933		$		$	$	$	$
Wire-drawing plants	15	22,970,877	1,911	1,849,047	1,980,895	7,551,014	5,570,119
Fabricating plants only	57	5,696,461	813	829,366	1,251,145	2,960,886	1,609,741
TOTAL	72	28,667,338	2,724	2,678,413	3,232,040	10,511,900	7,179,860
1934							
Wire-drawing plants	14	22,911,390	2,174	2,213,272	2,589,869	10,368,401	7,778,532
Fabricating plants only	55	5,906,692	989	1,059,468	1,936,557	4,316,160	2,379,603
TOTAL	69	28,818,082	3,163	3,272,740	4,526,426	14,684,561	10,158,135

TABLE 3

Size of Establishments, According to Production, Number of Employees and Capital Employed, 1934

	Number of plants	Capital employed	Number of employees	Selling value of products at works
(a) PRODUCTION				
Under $5,000	13	47,608	31	35,234
$5,000 to $10,000	11	75,499	41	80,523
$10,001 to $25,000	8	243,230	55	158,441
$25,001 to $50,000	6	524,414	84	221,959
$50,001 to $100,000	3	459,706	84	202,638
$100,001 to $250,000	11	7,426,345	306	1,657,630
$250,001 to $500,000	9	4,060,158	563	3,195,099
Over $500,000	8	15,981,122	1,999	9,133,037
TOTAL	69	28,818,082	3,163	14,684,561
(b) EMPLOYEES				
1 or 2	12	47,049	17	143,835
3 to 10	22	398,601	114	325,469
11 to 20	9	1,394,151	137	743,242
21 to 50	12	8,369,872	456	2,201,870
51 to 100	7	3,232,108	534	2,685,893
101 to 200	1	3,325,000	146	1,255,851
Over 200	6	12,051,301	1,759	7,328,401
TOTAL	69	28,818,082	3,163	14,684,561
(c) CAPITAL				
Under $25,000	32	229,755	115	388,570
$25,000 to $100,000	8	484,640	128	476,929
$100,001 to $500,000	16	4,713,599	620	3,150,458
$500,001 to $1,000,000	8	5,417,575	982	4,989,145
Over $1,000,000	5	17,972,513	1,318	5,678,985
TOTAL	69	28,818,082	3,163	14,684,561

TABLE 4

Power Equipment, 1933 and 1934

	1933 Number of units	1933 Total rated horse power	1934 Number of units	1934 Total rated horse power
Steam engines and turbines	5	324	8	400
Gasoline, gas and oil engines	2	42	2	42
Total Primary Equipment	7	366	10	442
Electric motors run by purchased power	943	16,845	997	17,321
TOTAL	950	17,211	1,007	17,763
Electric motors run by power generated by the establishment	24	461	27	631
Total Electric Motors	967	17,306	1,024	17,952
Boilers	33	4,100	38	5,165

TABLE 5

Materials Used in Manufacturing, 1934

Materials	Unit of measure	Materials made in producers' own works	Purchased Materials: Quantity	Purchased Materials: Cost at works
Iron and steel—				
Bars	short ton	340	502	26,414
Wire rods	short ton	109,178	45,577	1,433,675
Wire—plain	short ton	93,850	6,137	628,394
Galvanized	short ton	23,631	6,150	591,112
Other	short ton	1,278	1,586	273,254
Nail plate	lb.	987,297	27,874	1,209
Tack plate	lb.	1,281,375	1,327,420	38,049
Other iron and steel	xx	.....	.....	219,758
Other metals—				
Copper bars, rods, sheets, etc.	lb.	.....	515,136	59,277
Brass and bronze rods, sheets, etc.	lb.	.....	729,425	100,935
Lead	lb.	.....	306,770	12,509
Tin	lb.	.....	90,839	42,145
Zinc	lb.	.....	4,375,958	182,869
All other metals	xx	.....	.....	33,879

(*Please turn to Page 86*)

Rolling rods at 4000 all within ±.005″

The Rod bundles are transferred automatically from the Coil Conveyor to the Hook Carrier.

News for the steel industry is contained in latest reports from Guest, Keen & Nettlefolds, Limited. Their Wire Rod Mill at Cardiff, Wales, is now shown for the first time in these photographs. Our European Resident Engineer, Mr. Eric H. Fors, enthusiastically reports progress in a series of letters, parts of which will interest you.

All Details OK

August 12—"In erecting and starting this mill no departure was made from our drawings, except in a few minor details. Consequently, I wish to put on record that the Nettlefolds roll diameters, passes and speeds, are perfect as far as we have gone.

Mill Set Accurately Without Trial Bar

"The mill itself has been running up to my fullest expectations, and you will be surprised to know that we can set up the finishing mill so accurately that a trial bar stuck in at No. 11 will go around the repeater and straight through to the reels, and the only reason for putting it through is to take the shine off the passes before risking a full billet. This is a dream that has come true at last and its practical worth should be *a saving of anything up to 20 minutes per shift when we go into three shifts.*

Rolled Double Strand First Day

"I have already reported that we rolled double strand before the end of the first day. *I believe this is a world record.* The nearest European record is Longwy where we rolled double strand by the end of the first week."

Morgoil Bearings Hold Gauge

August 17—"It's simply grand to be able to turn off the water on the finishing mill when you want to shine up the finishing pass or look at the mill, without having to stop it or else see the bearings going up in blue smoke! It's also grand to be able to stop the mill and start it again without having to run trial bars through. Even if we never saved a unit of power, Morgoil bearings are still worth their keep."

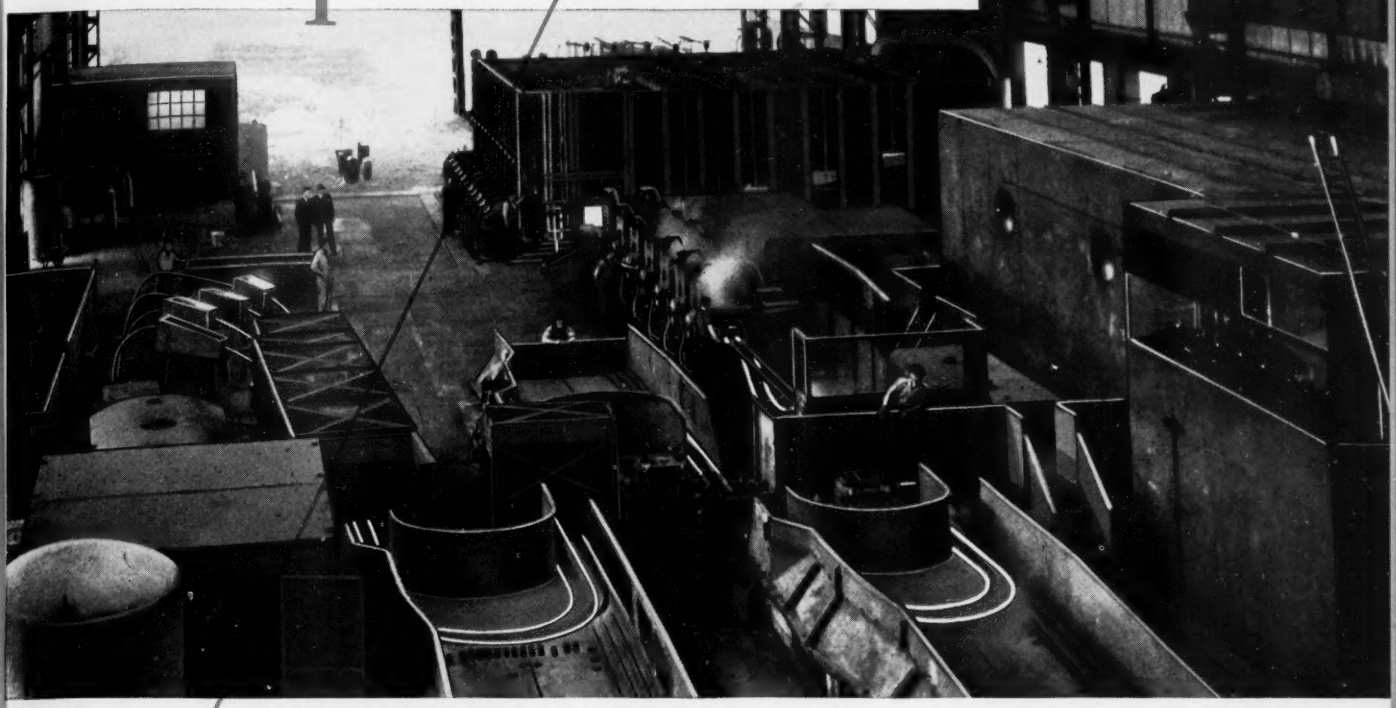
Rods Uniform Gauge and Roundness

August 20—"This layout with the finishing mill doubled back makes the most convenient rod mill to operate that I have ever seen.

Correctly designed, precision built, and mirror finished, Morgoil Bearings insure positive maintenance of roll setting with increased load capacities, power savings, longer life.

CONTINUOUS ROLLING MILLS—WIRE MACHINERY

feet per Minute

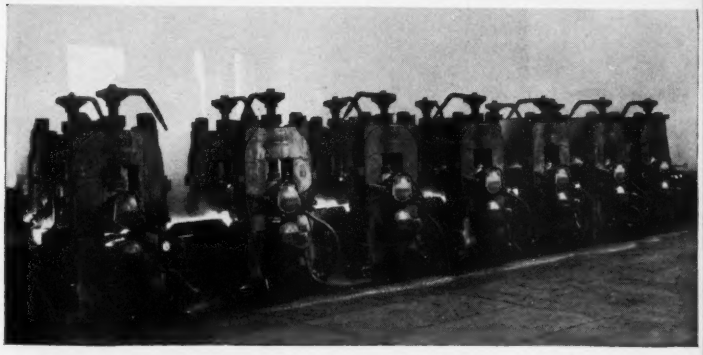


General view of Morgan 10" Continuous Rod Rolling Mill at the works of Guest, Keen & Nettlefolds, Limited, at Cardiff, Wales, England. Note that ovals are being repeated between stands 9 and 10, 11 and 12.

"During the week we had an order for which it was necessary to split the bundles. We took the opportunity of cutting at random 20 test pieces out of the middle of 20 bundles. I measured these pieces with a micrometer and found that the variation in roundness and gauge over the 20 samples did not exceed plus or minus .005". The mill is extremely flexible and safe."

.0035" Tolerances Practicable

September 26—"We are now within the tolerances of plus or minus .005" previously reported. Experience at Nettlefolds indicates that the accuracy from end to end of the same rod bundle can be attributed to the mill arrangement, and the accuracy of one rod bundle in relation to another is due to Morgoils.



Roughing Train of Morgan 10" Continuous Rod Rolling Mill. Note Morgoil Bearings, standard equipment throughout entire installation.

"To roll rods to a tolerance of plus or minus .0035" is quite possible with a heating furnace that can hold a uniform temperature and a mill of the Nettlefolds type equipped with Morgoil bearings throughout."

Morgan Experience

All of which appears to confirm our contention that *output uniformity* requires coordination throughout the mill.

From the original layout down to the finest detail, Morgan Continuous Rolling Mills are engineered as complete units to produce the required tonnage and desired accuracy. Experience plus sound engineering knowledge have produced the results which are back of the Morgan reputation today. MORGAN CONSTRUCTION COMPANY, Worcester, Massachusetts, U. S. A.

MORGAN
WORCESTER
ENGINEERS AND MANUFACTURERS

PRODUCER GAS MACHINES—COMBUSTION CONTROLS

TABLE 5 (Continued from previous page)

Materials Used in Manufacturing, 1934 Materials	Unit of measure	Materials made in producers' own works	Purchased Materials Quantity	 Cost at works
Other materials—				
Acid, muriatic, 20° Be	lb.	.....	1,537,403	36,510
Acid, sulphuric, 66° Be	lb.	.....	11,592,003	70,255
Lumber	M ft. B.M.	.....	1,064	50,649
Shipping containers	xx	.....	.....	336,133
All other materials	xx	.....	.....	389,400
TOTAL	xx	.....	.....	4,526,426

TABLE 6

Products Manufactured, 1934

NOTE—Data for the items specified below represent the totals for Canada as well as for the wire and wire goods industry, according to returns to the Industrial Census for 1934.

Products	Unit of measure	Quantity made	Quantity sold	Income from Sales
SECTION "A"—WIRES				$
(Total production, whether for sale or for further manufacture)				
Iron and Steel Wires—				
Plain wire	short ton	117,708	28,254	1,665,718
Galvanized wire	short ton	34,378	14,864	914,006
Other coated wire	short ton	4,193	3,475	326,746
Barbed wire	short ton	12,564	11,781	711,286
Cold rolled flat wire of all sizes, qualities and finishes	short ton	903	545	66,622
Drawn welding rods or welding wire in coils, or cut lengths, for gas or electric welding	short ton	1,182	875	95,018
Wire bale ties	short ton	5,021	5,280	396,806
SECTION "B"—NAILS, STAPLES AND TACKS				
Wire nails (all wire nails, including shoe rivets and other small sizes of wire nails)	kegs	1,062,417	1,064,457	3,395,322
Cut nails (all cut nails, and spikes cut from plate, including special large head cut shingle nails, but not including clout nails nor other small nails commonly classed as tacks)	kegs	12,338	12,597	68,485
Wire staples of all kinds	kegs	41,659	39,844	147,316
Tacks (all cut and wire tacks, including hob nails, clout nails, trunk nails and other small cut nails, but not cut shingle nails)	pound	2,110,102	2,131,743	261,953
SECTION "C"—WIRE FENCING AND WIRE NETTING				
Woven wire farm fence	short ton	7,250	7,890	637,445
Woven wire lawn fence	short ton	450	595	68,836
Woven wire chain link fabric	short ton	828	968	152,768
Woven wire poultry netting and fence	short ton	949	949	183,243
Ornamental iron fencing	short ton	48	169	10,830
Steel fence posts	xxx	.....	.....	72,401
Gates	number	8,746	11,492	62,261
Welded or woven wire mesh, for concrete reinforcement, or purposes other than fencing	short ton	194	1,033	84,508
Wire cloth, including screen cloths	xxx	.....	.....	579,252
SECTION "D"—WIRE GOODS				
Steel wire rope or cable	xxx	.....	.....	1,818,861
Twisted strand wire (including galvanized guy wire, wire clothes lines, twisted bed strand)	short ton	431	440	84,544
Steel wire hoops for casks, barrels or kegs	short ton	1,798	840	8,793
Steel wire upholstering springs and auto cushions	xxx	.....	.....	570,584
Other steel wire springs (except bedsprings)	xxx	.....	.....	351,970
Screens other than for windows	xxx	.....	.....	68,366
Wire shapes of all kinds	xxx	.....	.....	151,836
Miscellaneous wire goods (including wire lacing, hair pins, tire braids, wire kitchenware, paper clips, wire guards, display stands, etc.)	xxx	.....	.....	837,164

TABLE 6—PRODUCTS MANUFACTURED, 1934 (concluded)

NOTE—Data for the items specified below represent the totals for Canada as well as for the wire and wire goods industry according to returns to the Industrial Census for 1934.

Products	Unit of measure	made Quantity	Quantity sold	Income from sales
SECTION "E"—PRODUCTS OTHER THAN WIRE AND WIRE GOODS				
Bolts and nuts, horseshoe calks, screws, perforated metals, etc.	xxx	.....	.....	891,621
TOTAL	xxx	.....	.....	14,684,561

TABLE 7

Production and Factory Sales of Steel Wire, 1932-1934

		Wire, plain	Wire, galvanized	Wire, other coated	Wire, barbed
1932—Quantity made	Tons	86,931	26,056	3,524	8,060
Quantity sold	Tons	15,439	9,522	2,691	6,770
Income from sales	$	1,079,958	602,541	251,299	411,202
1933—Quantity made	Tons	87,225	24,315	3,923	8,799
Quantity sold	Tons	15,931	9,802	3,242	8,406
Income from sales	$	1,093,654	573,849	293,817	495,578
1934—Quantity made	Tons	117,708	34,378	4,193	12,564
Quantity sold	Tons	28,254	14,864	3,475	11,781
Income from sales	$	1,665,718	914,006	326,746	711,286

Note—Figures on quantity made include the amounts made and used in subsequent processes in the same plants such as the manufacture of nails, screws, galvanized wire, etc.

TABLE 8

Production and Factory Sales of Wire Fencing, 1932-1934

Years	Quantity made	Quantity sold	Income from sales
	Tons	Tons	$
1932—Farm fence	7,787	7,898	657,385
Lawn fence	681	670	77,849
Chain link fabric	1,274	1,462	213,941
Total for 1932	9,742	10,030	949,175
1933—Farm fence	5,510	6,045	515,604
Lawn fence (x)	490	512	61,123
Chain link fabric	759	772	118,351
Total for 1933	6,759	7,329	695,078
1934—Farm fence	7,250	7,890	637,445
Lawn fence	450	595	68,836
Chain link fabric	828	968	152,768
Total for 1934	8,528	9,453	859,049

(x) Includes some ornamental wire fencing.

TABLE 9

Production and Factory Sales of Nails, Tacks and Staples, 1932-1934

Years		Wire staples	Wire nails and spikes	Wire and cut tacks	Cut nails
1932—Quantity made	lb.	3,258,712	68,435,413	1,330,428	.....
Quantity sold	lb.	3,165,437	67,363,738	1,893,956	915,356
Value of sales	$	117,615	2,239,121	238,656	46,564
1933—Quantity made	lb.	2,939,053	74,492,131	2,081,257	.....
Quantity sold	lb.	3,015,026	74,336,418	1,917,597	851,047
Value of sales	$	108,642	2,498,894	259,443	45,994
1934—Quantity made	lb.	4,165,900	106,241,700	2,110,102	1,233,800
Quantity sold	lb.	3,984,400	106,445,700	2,131,743	1,259,700
Value of sales	$	147,316	3,395,322	261,953	68,485

TABLE 10

Production of Steel Wire Rope and Cable, 1932-1934

Years	Wire rope and cable	Twisted strands, clothes lines, etc.	TOTAL
	$	$	$
1932	1,136,549	162,057	1,298,606
1933	1,138,338	98,250	1,236,588
1934	1,818,861	84,544	1,903,405

TABLE 11

Production of Steel Bale Ties, 1932-1934

Years	Quantity made	Quantity sold	Income from sales
	lb.	lb.	$
1932	5,789,700	5,753,348	225,862
1933	6,995,804	7,133,939	276,805
1934	10,042,000	10,560,000	396,806

TABLE 12

Imports Into Canada and Exports of Wire and Wire Goods, 1934
(From "The Trade of Canada, Calendar Year 1934" published by the Dominion Bureau of Statistics at Ottawa)

Items		Quantity	Value
IMPORTS			$
Wire of iron or steel:—barbed fencing, coated or not	cwt.	6,244	33,071
Wire of iron or steel, coated with zinc or spelter, curved or not, in coils .144, .104 or .092 inch in diameter with tolerance not to exceed .004 inch, and not for use in telegraph or telephone lines	cwt.	556	1,592
Wire of iron or steel, drawn flat or cold rolled flat after drawing, coated or not, n.o.p., not more than .25 inch in width and less than .1875 inch in thickness	cwt.	181	3,523
Wire of iron or steel, coated with zinc or spelter, n.o.p.	cwt.	10,031	24,578
Wire of iron or steel, single or several, covered with any material including cable so covered; coated, n.o.p.	xx	.....	31,801
Wire of iron or steel, twisted, braided or stranded including wire rope or cable, coated or not, n.o.p.	xx	.....	125,070
Wire of steel, flat or woven flat, including steel strip in the coil, coated or not; .064 inch in thickness or thinner with tolerance not to exceed .002 inch, for use exclusively in the manufacture of corset clasps, steels, wires and dress stays	cwt.	2,618	44,946
Wire of iron or steel, valued at not less than 2 3/4 cents per pound, for use exclusively in the manufacture of wire rope	cwt.	119,244	757,151
Wire of steel, single, not covered, in coils, for use exclusively in trolling in deep sea or inland commercial fishing operations	xx	.....	2,904
Wire, steel, when imported by manufacturers of machine card clothing for use exclusively in the manufacture of machine card clothing in their own factories	cwt.	73	2,036
Wire of iron and steel, n.o.p.	cwt.	17,673	146,106
Woven or wire fencing of iron or steel, from wire not more than .144 inch and not less than .080 inch in diameter with tolerance not to exceed .004 inch; wire fencing of iron or steel, coated or not, n.o.p.	xx	.....	7,439
Woven or welded wire fencing of iron or steel coated or not, n.o.p.; wire cloth or wire netting of iron or steel, coated or not	xxx	.....	79,616
Woven netting of iron or steel, coated, made from wire of 17 gauge or heavier with meshes not smaller than one inch and not larger than two inches, with specially strengthened joints, when for use exclusively on fur farms	xx	.....	51,715
Wire screens, doors and windows	xx	.....	2,361
Tacks of all kinds	lb.	29,101	8,872
Wire roofing nails of all sizes and wire nails one inch or more in length, of iron and steel, coated or not	cwt.	2,015	6,671
Wire nails less than one inch in length, and nails and brads, n.o.p., of iron and steel, coated or not	lb.	42,842	5,379
Pins, manufactured from wire of any metal, n.o.p.	lb.	296,414	104,400
Spring-beard and latch needles	M	4,568	45,180
Needles of any material or kind, n.o.p.	xx	.....	219,878

TABLE 12 (Continued)

Imports Into Canada and Exports of Wire and Wire Goods, 1934

(From "The Trade of Canada, Calendar Year 1934" published by the Dominion Bureau of Statistics at Ottawa)

Items		Quantity	Value
IMPORTS			
Furniture springs	xx	.....	8,097
Wood screws of iron and steel	xx	.....	5,814
Machine and other screws, n.o.p., iron and steel	xx	.....	87,638
Brass wire, n.o.p.	lb.	434,692	92,458
Wire cloth or woven wire of brass, n.o.p.	xx	.....	34,135
Copper wire, n.o.p.	lb.	72,515	18,011
Copper wire cloth or woven wire of copper	xx	.....	1,803
Wire of brass, zinc, iron or steel, screwed or twisted, flattened or corrugated, for use in connection with nailing machines to manufacture boots and shoes	lb.	10,835	1,368
Wire, single or several, covered with any material including cable so covered, n.o.p.	xx	.....	103,517
Wire, tinsel, for the manufacture of braids, cords, tassels, ribbons or trimmings	xx	.....	15,142
Wire, twisted, braided or stranded, including wire rope and wire cable, coated or not n.o.p.	xx	.....	17,357
Wire of all kinds, n.o.p.	xx	.....	111,334
Nails and tacks, brass and copper	xx	.....	1,934
Screws, wood, machine or other, of brass, copper or other metal, n.o.p.	xx	.....	11,848
Cages, bird, squirrel and rat, of wire and metal parts, thereof	xx	.....	15,336
TOTAL IMPORTS OF WIRE AND WIRE GOODS	xx	.....	2,230,081
Items		Quantity	Value
EXPORTS			$
Wire, barbed, of iron and steel	cwt.	68,224	187,641
Wire, woven fencing, of iron and steel	xx	.....	46,933
Wire, other, of iron and steel, n.o.p.	xx	.....	586,280
Nails, wire	cwt.	250,834	672,568
Nails, brads, spikes and tacks of iron and steel, of all kinds, n.o.p.	cwt.	25,724	123,572
Needles and pins of all kinds	xx	.....	669,429
Copper wire and cable, insulated	xx	.....	323,683
TOTAL EXPORTS OF WIRE AND WIRE GOODS	xx	.....	2,610,106

TOTAL PRODUCTION IN CANADA OF BRASS AND COPPER WIRE AND CABLE

1933 AND 1934

Note—These figures represent the total output for Canada and include the brass and copper wire and cable made by concerns which were not classified to the Brass and Copper Products Industry.

Kinds	Selling Value at Works 1933	Selling Value at Works 1934
	$	$
Brass wire	54,919	92,109
Copper wire, bare	1,129,080	1,692,376
Weatherproof	611,741	939,614
Rubber insulated, braided	918,527	1,416,529
Cambric insulated, braided	53,569	90,080
Rubber insulated, leaded	180,338	299,891
Cambric insulated, leaded	88,603	172,718
Paper insulated, leaded	148,425	185,865
Telephone cable of all kinds	387,235	423,922
Armoured cable	406,916	496,277
Cord, heater, lamp, fixture, all rubber, etc.	265,591	550,037
All other copper wire and cable	958,692	1,269,404
Total Brass and Copper Wire and Cable	5,203,636	7,628,822

MATERIALS USED IN MANUFACTURING, 1933 AND 1934

Materials	Unit of measure	1933 Quantity	1933 Cost at works	1934 Quantity	1934 Cost at works
			$		$
Aluminum—Rods and bars	lb	309,835	144,346	348,653	180,959
Brass and bronze—Rods and bars	lb	499,583	70,844	633,596	95,091
Copper—Rods	lb	14,793,411	1,166,520	21,369,673	1,633,552
Iron and steel—Steel rods	short ton	430	61,777	836	112,473
Zinc—Ingot and bar	lb	293,851	18,235	448,343	26,829
Total	.....	.....	1,461,722	.....	2,048,904

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in Nov. 1935 and Nov. 1934
(In gross tons)

	Nov. 1935	Oct. 1935	Nov. 1934
Wire rods	1,796	2,473	3,710
Hoops, bands and strip steel	4,270	4,803	2,027
Plain black or galvanized iron or steel wire	3,383	4,823	2,034
Barbed wire and woven wire fencing	2,993	3,671	2,570
Woven wire screen cloth	60	95	64
Wire rope	480	196	212
Insulated iron or steel wire and cable—see analysis below			
Other wire and manufactures	508	538	337
Wire nails	1,100	1,041	1,044
Tacks	44	43	46
Other nails, including staples	180	225	215
Bolts, machine screws, nuts, rivets and washers	503	538	434
Total, these 11 classifications	15,317	18,446	12,693

Imports of Iron and Steel Wire Products Into the United States
(In gross tons)

Concrete reinforcement bars	166	76	101
Hollow bars and drill steel	88	141	43
Merchant steel bars	.....	.....	1,696
Wire rods	2,612	2,475	880
Barbed wire	1,486	2,935	294
Round iron and steel wire	253	367	209
Telephone and telegraph wire	15	2	1
Flat wire and strip steel	204	214	216
Wire rope and strand	281	178	60
Other wire	120	212	64
Hoops and bands	1,597	1,741	1,840
Nails, tacks and staples	1,883	2,640	486
Bolts, nuts and rivets	35	6	29
Total, these 13 classifications	8,740	10,987	5,919

EXPORTS
INSULATED WIRE AND CABLE, NOVEMBER, 1935

	Foreign		To U. S. Possessions	
	Pounds	Dollars	Pounds	Dollars
Insulated iron or steel wire and cable	18,964	$ 2,566	1,433	$ 274
Rubber-covered wire	252,355	59,898	64,039	12,022
Copper weatherproof wire	198,835	41,986	44,943	7,430
Copper telephone cable	17,962	4,693	20,057	2,931
Other insulated copper wire	328,948	74,642	112,780	18,340
Nickel-chrome electric resistance wire	32,852	38,936	.....	.....
Total, these 6 classifications	849,916	$222,721	243,243	$40,997

Exports

NOVEMBER exports of iron and steel products from the United States (205,242 gross tons) were marked by (1) the lowest level of scrap, iron and steel, shipments since February 1934; (2) an upward trend in semi-finished and finished products when compared with the previous month and November 1934; and (3) the smallest aggregate total for any previous month of the year—declines of 16.4 percent and 40.5 percent, respectively, being recorded from October shipments and those effected during the comparable month of the previous year.

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EXCLUDING scrap, pig iron, and ferromanganese and spiegeleisen, November shipments included 94,302 tons of semi-finished and finished items which was an advance of some 7 percent and 14.5 percent, respectively, as compared with October, 1935, and the comparable month of 1934.

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SCRAP, iron and steel, with a total diminished by 40,889 tons from shipments made during October (111,605 tons lower than November 1934 exports), was one of the highlights in the November trade, as losses in other items were more than compensated for by gains noted in still others. For instance, a 2,378-ton decrease in steel bar shipments was counterbalanced by a healthy 3,146-ton increase in those of black steel sheets. In only three classifications did losses of 1,000 tons or more occur, whereas, gains of this amount or more were had in six.

✦ ✦ ✦

Reduced Scrap Shipments Sufficient to Turn Export Trend Downward

SCRAP, iron and steel exports (104,961 tons) veered downward 28 percent from those made during October, more than sufficient to cause the lower aggregate trade noted. Despite the diminished total trade, gains were registered in 33 export classifications, losses obtaining in 31. The most pronounced decrease was recorded in scrap, iron and steel, 40,889 tons, followed by steel bars, 2,378 tons, cast-iron pressure pipe and fittings, 1,316 tons, plain wire, 972, and strip steel, cold rolled, 886 tons. The healthiest gain registered was that in black steel sheets, 3,146 tons, closely flanked by heavy rails, 2,660 tons, skelp, 2,430 tons, which in turn were followed by galvanized steel sheets, 1,644 tons, tanks, not lined, 1,183 tons, tin plate scrap, 1,057 tons, and tin plate and taggers' tin, 886 tons.

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SCRAP, iron and steel—notwithstanding the decrease noted—continued in its role as the leading iron and steel product exported (from a tonnage standpoint), the total of 104,961 tons being chiefly distributed among Japan, 36,741, Italy, 25,065, Canada, 16,024, the United Kingdom, 15,339, and China, 4,086. Skelp, iron or steel, 15,642 tons, practically all went to Canada, 15,640. Tin plate and taggers' tin ranked third, shipments of 13,330 tons finding numerous markets of which the chief ones were Japan, 1,707, China, 1,475, the Philippine Islands, 1,436, Argentina, 1,106, Netherland India, 826, and Chile, 821. Black steel sheets with a total of 9,592 tons also found widespread outlets, with Canada, 2,914, the chief purchaser, followed by Australia, 2,073, Mexico, 1,204, Soviet Russia, 811, and the United Kingdom, 793. The 5,855-ton trade in galvanized steel sheets was likewise divided among numerous markets, the principal ones being the Philippine Islands, 2,483, Colombia, 698, Cuba, 521, Mexico, 391, the Union of

South Africa, 320, and Canada, 246. Heavy rails, 4,164 tons, made up the sixth product in the month's trade and for the most part went to China, 2,636, Japan, 616, British India, 320, and the Philippine Islands, 178.

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CANADA supplanted Japan as the leading individual market (on a tonnage basis), its trade of 47,644 tons involving a rather widespread class of products. The most prominent items of purchase were scrap, iron and steel, 16,024, skelp, 15,640, black steel sheets, 2,914, ingots, blooms, etc., 2,146, strip steel, hot rolled, 1,862, strip steel, cold rolled, 1,671, plain shapes, 1,419, and steel bars, 1,303. Japan followed with a trade of 45,357 tons made up chiefly of scrap, iron and steel, 36,741, tin plate scrap, 2,619, waste-waste tin plate, 2,029, tin plate and taggers' tin, 1,707, wire rods, 1,082, and heavy rails, 916. Italy was the third market, its takings of 25,700 tons being made up principally of scrap, iron and steel, 25,065, tanks, not lined, 255, black steel sheets, 234, and fabricated shapes, 111. The United Kingdom followed with purchases totaling 16,939 tons, of which the chief products were, scrap, iron and steel, 15,339, strip steel, hot rolled, 1,862, strip steel, cold rolled, 1,671, black steel sheets, 793, and black iron sheets, 375. China was the fifth market, the outstanding items in its trade of 9,935 tons being scrap, iron and steel, 4,086, heavy rails, 2,636, tin plate and taggers' tin, 1,475, tin plate scrap, 279, black steel sheets, 273, waste-waste tin plate, 223, and steel bars, 217. Mexico followed with purchases totaling 8,750 tons in a varied trade of which the predominating items were scrap, iron and steel, 3,669, black steel sheets, 1,204, tin plate and taggers' tin, 690, cast-iron pressure pipe and fittings, 578, barbed wire, 409, galvanized steel sheets, 391, and seamless casing and oil-line pipe, 290.

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Imports

IRON and steel imports into the United States during November at 56,€37 tons brought to a halt the upward import movement which had prevailed during the past several months, and represented a 4.4 percent decrease when compared with October receipts. However, this total was considerably ahead (60 percent) of the volume moving in the November 1934 trade. The November trade was covered by 16 countries of supply, of which 8 shared to the extent of 1,000 tons or more as compared with 10 sending in that volume during the preceding month. Compared with October, losses were recorded in 20 import classifications, gains in 13, while in 4 no trade occurred during either month. The outstanding decreases were recorded in pig iron, 1,618 tons, barbed wire, 1,449 tons, sheets, skelp, and sawplate, 1,398 tons, with other decreases of moment being noted in 'other pipe', 864 tons, cotton ties, 835 tons, nails, tacks, and staples, 757 tons, and structural shapes, 436 tons. The most prominent increase was that registered in scrap, 4,263 tons, followed by ferromanganese and spiegeleisen, 1,613 tons, the only other increase of any consequence being wire rods, 137 tons.

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PIG iron, 15,550 tons, was the leading product received on a tonnage basis, and was chiefly imported from the Netherlands, 9,782, British India, 3,845, and Canada, 1,188. Scrap, 15,392 tons followed, practically all being supplied by Canada, 15,334. Next was ferromanganese and spiegeleisen, 8,153 tons, received mostly from Canada, 6,106, Norway, 1,471, and the United Kingdom, 194. The fourth product of importance was represented in structural shapes, 3,828 tons, with Belgium, 2,573, and France, 1,026, the chief sources of supply. Wire rods, 2,162, ranked next, originating for the most part in Sweden, 1,134, Germany, 977, and Belgium, 487. Bars, whether solid or hollow, 2,146 tons, was the sixth product, the chief countries of supply being Belgium, 1,288, Germany, 369, Sweden 263, and France, 113.

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CANADA remained the leading supplier of iron and steel products to the United States with a November trade aggregating 23,059 tons, of which the chief items were scrap, 15,334, spiegeleisen, 6,106, pig iron, 1,188, and rails, and rail fastenings, 261. The Netherlands followed with a total trade of 9,958 tons, practically all made up of pig iron, 9,958, and ferromanganese and spiegeleisen, 154, Belgium, 6,439 tons, ranked next, the predominating products in its trade being structural shapes, 2,573 bars, whether solid or hollow, 1,288, 'other hoops and bands', 873, wire rods, 487, nails, tacks, and staples, 266, and sheets, skelp, and sawplate, 252. Germany was the fourth source of supply its total trade of 6,097 tons mostly involving nails, tacks, and staples, 1,583, barbed 1,316, wire rods, 977, bars, whether solid or hollow, 369, rails, and rail fastenings, 357, and welded pipe, 326. British India, next ranking, confined its participation solely to pig iron, 3,845 tons, while Sweden, the next supplier had an aggregate share of 2,744 tons. The outstanding items in this trade were, wire rods, 1,134, bars, whether solid or hollow, 263, pig iron, 260, 'other pipe' 232, round iron and steel wire, 196, and sponge iron, 195.

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A DECLINE of 30.6 percent and 34 per cent quantity and value, respectively, was noted in **card clothing** receipts — 12,773 square feet valued at $16,633 — when compared with imports of that item during October. The United Kingdom, 12,089 square feet valued at $15,587, and Germany, 684 square feet valued at $1,046, supplied the entire volume.

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WIRE cloth end screening receipts registered a rise of some 35 percent over those moving in the October trade to reach a total of 85,547 square feet, and came principally from Germany, 30,833 square feet, Canada, 24,984 square feet, the Netherlands, 20,159 square feet, and France, 8,360 square feet.

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THE trade in **fourdrinier and other paper-making wires,** 37,664 square feet, followed a downward trend during the month, declining some 40 percent under that for the previous month. Aus-

(*Please turn to page 102*)

A Review of Recent Wire Patents

No. 2,022,827, INSULATED WIRE, Patented December 3, 1935 by Samuel Ruben, New Rochelle, N. Y., assignor to Vega Manufacturing Corporation, Wilmington, Del., a corporation of Delaware.

A surface insulation for the wire is provided and comprises a mixture of finely divided oxide, a resinous binder and a boron compound, the textile winding over this insulation being impregnated with substantially the same constituents of the surface insulation.

✦ ✦ ✦

No. 2,023,364, METAL COATED FERROUS ARTICLE AND PROCESS OF MAKING IT, Patented December 3, 1935 by Frederick M. Crapo, Muncie, Ind., assignor to Indiana Steel & Wire Company, Muncie, Ind., a corporation of Indiana.

About the iron wire core is a hot-galvanized coating of zinc, and over that an electro-deposited coating which is practically wholly of cadmium.

✦ ✦ ✦

No. 2,023,998, COPPER WIRE TREATMENT FOR ENAMELING, Patented December 10, 1935 by Pierre Fustier, Lyon, France, assignor of one-half to Societe Anonyme J. Bocuze & Cie, Lyon (Rhone) France, a limited liability company of France.

So as to provide a more uniformly enameled wire, this inventor passes the same, prior to the final drawing, with the wire acting as an anode, through an electrolytic solution of copper sulphate in order to initially remove and electrolytically strip off the surface inequalities and protuberances thereon.

✦ ✦ ✦

No. 2,024,069-70, BOLT & METHOD OF MAKING BOLTS, Patented Dec. 10, 1935 by John H. Sharp, Chicago, Ill.

These patents cover a bolt and the method of making the same, the bolt being adapted primarily for securing the wooden sheathing upon the metal framework of freight cars. The head and shank of the bolt are so constructed that the head may be flush with the sheathing and it is claimed that the construction prevents moisture from finding its way past the head and around the shank.

✦ ✦ ✦

No. 2,024,071, BOLT, Patented Dec. 10, 1935 by Steadman O. Taylor, University City, Mo., and Sven J. Strid, Chicago, Ill., assignors to William E. Sharp, Chicago, Ill.; Minnie E. Sharp, executrix of the estate of said Sharp, deceased.

The invention is substantially the same as that of patents 2,024,069 and 2,024,070, this particular bolt having a peripheral fin adjacent the head, the fin having a frusto-conical outer surface tapering toward the vertex away from the head.

✦ ✦ ✦

No. 2,024,183, METHOD OF MAKING CHAIN LINKS, Patented Dec. 17, 1935 by Alexis R. Pribil, Saginaw, Mich.

More specifically, the links are made of rolled sheet metal having retainer lugs cold formed integral therewith.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 17 East 42nd St., New York.

No. 2,024,307, MATTRESSING, Patented Dec. 17, 1935 by Salomon Rosenfeld, Garches, France.

Flexible spring elements of wire are provided, all being alike, so that any number can be joined together in order to form a spring structure for seats, mattresses, cushions and the like.

✦ ✦ ✦

No. 2,024,593, METHOD OF MAKING SQUARE-HEAD SCREWS, Patented Dec. 17, 1935, by Harrington Moore, Medford, Mass.

The inventor provides a method for shaping the screw head without heating the stock.

✦ ✦ ✦

No. 2,024,768, WIRE-DRAWING APPARATUS, Patented Dec. 17, 1935 by Charles D. Johnson, Worcester, Mass., assignor to Johnson Steel & Wire Company, Inc., Worcester, Mass., a corporation of Mass.

The apparatus includes a drawing die, a drawing drum for drawing the wire through the die and a device for applying a dry lubricant to the wire before it passes through the drawing die. A dry, movable wire-cooling surface is located between the drawing die and the drawing drum, the wire contacting therewith so that it is cooled after it leaves the die but it cooled before it is wound on the drawing drum.

✦ ✦ ✦

No. 2,024,769, WIRE-DRAWING APPARATUS, Patented Dec. 17, 1935, by Charles D. Johnson, Worcester, Mass., assignor to Johnson Steel & Wire Company, Inc., Worcester, Mass., a corporation of Mass.

In this construction, an idler pulley is provided and about which the wire passes in its travel from the die to the drawing drum, the idler pulley having a housing surrounding it and provided with a chamber in which the pulley operates, surrounded by a dry lubricant.

✦ ✦ ✦

No. 2,024,796, WIRE MESH FABRIC, Patented Dec. 17, 1935 by Noah S. Harter, Waukegan, Ill., assignor to Cyclone Fence Company, Waukegan, Ill., a corporation of Ill.

The invention lies primarily in the selvage structure, the wire fabric comprising interwoven longitudinal and transverse strands, the transverse strands having end portions bent to form a right angle, the bent end portions of all the transverse strands projecting in the same direction and being rigidly joined to an adjacent transverse strand.

✦ ✦ ✦

No. 2,024,806, WOVEN WIRE SCREEN, Patented Dec. 17, 1935 by Roger W. Disbro, Shaker Heights, and John Boehm, University Heights, Ohio, assignors to The W. S. Tyler Company, Cleveland, Ohio, a corporation of Ohio.

An important object of this invention is to provide a woven wire screen which will maintain uniformity practically during its entire life.

✦ ✦ ✦

Reissue No. 17,792, FASTENER, Patented Dec. 17, 1935 by Heyman Rosenberg, New York, N. Y.

This fastener is provided for metal work and includes a pin-like body having a cylindrical pilot at its entering end and a non-spiral, circumferentially disposed outstanding rib having its entering face inclined towards the pilot. The rib is hardened sufficiently so that the fastener may be used for securing metal work, such as soft iron or soft steel, without injury to the rib.

✦ ✦ ✦

No. 2,025,328-29, MATTRESS AND METHOD OF MAKING THE SAME, Patented Dec. 24, 1935 by Edward L. Bronstien, St. Paul, Minn.

The main feature of these mattress constructions is the provision of edge rolls attached to the boxing without the stitches showing.

✦ ✦ ✦

No. 2,025,491, WIRE FABRIC SEAM, Patented December 24, 1935 by Otto A. Abendroth, Appleton, Wis.

The inventor provides a seam, which he claims will not mark the paper and will give good drainage. The method comprises removing the end weft wire of each of the fabric parts to be joined and placing the projecting ends of the warp wires in side to side relation, whereupon the overlapping ends of the warp wires are joined by solder.

✦ ✦ ✦

No. 2,025,535, WIRE DRAWING BLOCK, Patented Dec. 24, 1935 by William H. Sommer, Peoria, Ill., assignor to Keystone Steel & Wire Company, Peoria, Ill., a corporation of Ill.

A wire drawing block is provided having a hardened peripheral face to provide a rigid non-deformable supporting surface and an abrasive-resisting plating supported by this face to constitute the wire-engaging surface. Preferably, the plating is of chromium.

✦ ✦ ✦

No. 2,205,961, WIRE NAIL, Patented Dec. 31, 1935, by Herman James Stone, Brockton, Mass.

Specifically, this nail is provided for securing asbestos shingles to wooden structures, the portion of the shank entering the wood having barbs.

✦ ✦ ✦

No. 2,026,007, COIL SPRING, Patented Dec. 31, 1935 by Herbert E. White, Lakewood, Ohio, assignor to Eaton Manufacturing Company, Cleveland, Ohio, a corporation of Ohio.

A coil spring is provided, made from round stock, and having an end convolution a portion of which is of crescent-shaped cross section. It is stated that this coil spring may be manufactured without the necessity of accurately grinding or machining the flattened ends.

Outstanding Personalities of the Wire Industry

JOHN B. THOMAS
Asst. Mgr. of Wire Sales
Wheeling Steel Corp.

✦ ✦ ✦

MR. John B. Thomas, since 1929 General Sales Manager and Comptroller of Mid-States Steel & Wire Company, Crawfordsville, Ind., has been appointed Assistant Manager of the Wire Sales Division of the Wheeling Steel Corporation, with headquarters at the General offices in Wheeling. Prior to his connection with the Mid-States Company, Mr. Thomas was with the Keystone Steel & Wire Company of Peoria, Ill.

R. L. MEAD

R. L. Mead in Charge of P. & H. Chicago Office

ANNOUNCEMENT is made by the Harnischfeger Corporation of Milwaukee of the appointment of Mr. R. L. Mead as manager of the Corporation's Chicago office at 20 North Wacker Drive.

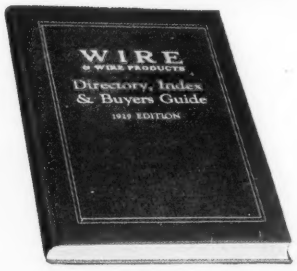
✦ ✦ ✦

WELL known through his fifteen years of activity in the field of material handling equipment, Mr. Mead, since 1921, or for six years, was with the Industrial Brownhoist Company. Subsequently, he was with The Ohio Locomotive Crane Company, McMyler Interstate Company, and most recently he was with the Link Belt Company as District Sales Manager.

✦ ✦ ✦

(*Please turn to page 105*)

Constantly Used for Buying Reference !



WIRE
& WIRE PRODUCTS

Buyers Guide and Year Book of the Wire Association

1936 Edition

ADVERTISING RATES

4 Pages	$250.00	One-half Page	$60.00
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You are hereby authorized to insert our advertisement to occupy ..... page in the 1936 Edition of WIRE & WIRE PRODUCTS BUYERS GUIDE & YEAR BOOK OF THE WIRE ASSOCIATION for which we agree to pay $..... ..... on publication.

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By .....

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'Round the World With the Wire Industry

British Company Formed to Facilitate Agreement Between the British Iron and Steel Federation and International Steel Cartel

THE British Iron and Steel Corporation—a private company—has been registered by the British Iron and Steel Federation as part of the machinery and reorganization of the iron and steel industry, according to the November 29 issue of the "Financial Times". This company is to be the instrument through which the agreement between the Federation and the International Steel Cartel will be implemented and it will be concerned both with iron and steel imports into the United Kingdom and the regulation and development of the export trade. The necessity for the registration of the new company is the provision of a legal entity which, on behalf of the industry as a whole, can enter into contracts and financial commitments. The British Iron and Steel Federation itself cannot assume these obligations under the terms of its constitution.

✦ ✦ ✦

CONVERSATIONS have been continued between representatives of the British Federation and the Continental Steel Cartel in connection with export quotas.

✦ ✦ ✦

Favorable Position Enjoyed in Chilean Market by Germany

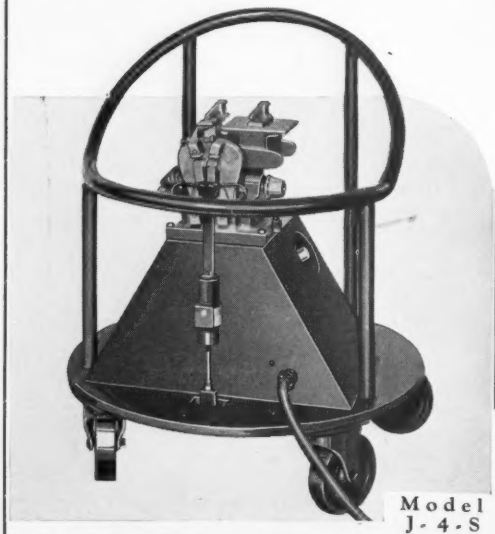
THE exchange advantage normally enjoyed by Germany in its current trade with **Chile** is with few exceptions the determining factor in the purchases in Chile of imported iron and steel products. This advantage which arises through the combined operations of the exchange control in Germany and the compensation treaty in effect between Germany and Chile has been largely responsible for the loss of this trade by the United States during the course of the past year to eighteen months.

At the present time the exchange situation distinctly favors Germany and representatives of American iron and steel manufacturers have advised that whereas they were able to do business in October of this year at the commencement of December they were placed in a practically non-competitive position for other than orders for special materials. It is reported further that the State Railways of Chile are restricting their purchases considerably as an economy measure and that there is the seasonal decline in the market as firms approach the year end inventories.

✦ ✦ ✦

Further Extension Announced for The Vickers' Works of the English Steel Corporation

LARGE extensions to the Vickers' works of the **English** Steel Corporation at Sheffield have been announced by a director and general manager of the corporation according to the November 27 issue of the "Financial Times". Two or



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Wins instant approval!

Low Type MICRO-WELD MODEL (Only 31" high)

The wide-spread demand for a portable, low-type welder is successfully met by this new MICRO Model J-4-S.

Height to welding dies—23".

Round steel base—no corners or edges to catch wires.

Frame—heavy rolled steel plates, arc welded.

Welding headpieces—hard bronze.

Full swivel casters—easy to move in any direction.

Guard rail—protects working parts.

Annealing dies for use on hard rolled and high carbon material—regular equipment.

Welding capacity —8 to 18 gauge.

Quickly proves its convenience and efficiency wherever in use.

Works close to reel for galvanizing and other applications.

Micro Model J-4-S solves many perplexing welding problems.

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CHICAGO, ILL.
20 N. Wacker Drive
Phone State 7468

PEORIA, ILL.
Factory and General Offices

'Round the World With the Wire Industry

three years ago the casting of ingots of 175 tons was thought a considerable item but now the casting of large three-furnace ingots has been almost a weekly occurrence and in anticipation of still further demands for large forgings, the corporation has been considering four-furnace ingots of at least 220 to 230 tons weight.

✦ ✦ ✦

THE probable reopening of the malleable works at Stockton, England, was one of the features which occurred on the Teesside during November; also the expected operation in 1936 of the continuous billet, bar and strip mill being built at Cargo Fleet Works at a cost of $2,500,000 which is destined, it is said to check the importation of Continental billets.

✦ ✦ ✦

Manufacturers in the United Kingdom Making Plant Extension

MESSRS. R. B. Tennent, a firm in the Glasgow area have acquired from the United States the right to manufacture "Adamite" alloy steel products. Additional plant, which has just been installed for this purpose, includes new roll turning lathes and 4 large annealing furnaces, and the plant is said to be capable of casting a roll larger than any of its type previously produced in the country. Messrs. Head, Wrightson, constructional engineers, have extended their works to include a new drop-forging plant for motor vehicle work. The United Steel Companies are undertaking a 3-year program of improvements. Messrs. Babcock & Wilcox are undertaking a large extension of their tube works at Dumbarton which is already in part completed. The Managing Director of the South Durham Steel & Iron Company, Ltd., recently returned from a visit to the United States, and stated recently that he had come back prepared to recommend important expenditures on new plants at the various works of the group. The mill at present under construction is expected to reduced the importation of billets from the Continent.

✦ ✦ ✦

German Notes

THE German wire netting industry is operating at nearly 100% capacity. Shipment dates have been extended to over 14 weeks from date of orders, mainly due to very heavy export orders. The domestic business is not as dull as is usually the case, because the industry has issued so-called "winter prices" by which buyers get 5% discount for all orders placed before December 31st and 3% if orders are placed before January 20th; after which date the regular prices are again quoted. This has been arranged to distribute orders in a better way than has usually been the case during the winter season. The wire nail

(*Please turn to page 96*)

ACE MR-10 RUBBER LINED
WIRE PICKLING TANK WITH STONE FACING
Prevents Corrosion
Stands Mechanical Abuse
AMERICAN HARD RUBBER COMPANY
Information and Catalogue on Request
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'Round the World With the Wire Industry

industry has increased operations to 72-73%, the barbed wire to 82-85% and the round wire makers to 74-76% capacity. The wire rope industry is operating at 62-64% capacity; rivet makers at 82-85%, the black bolt and nut industry at 62-64%, the fish bolt at 53-55% and the wood screw industry has increased operations to 72-75%. The trade in non-ferrous metal wire products is satisfactory. In this trade the Italian competition has entirely disappeared and the German industry is benefiting thereby. This section of the industry is operating at approximately 65-68% capacity, and the copper wire industry at 70-72%.

✦ ✦ ✦

IT is of interest that the Hungarian cable makers are now also restricting the production of copper cables in favor of aluminum. Aluminum is to be substituted for copper in all high power transmission lines and a commission which toured Germany reported favorably on this subject.

✦ ✦ ✦

THE principal German wire makers are increasing dividends. The Drahtwerke Hamm are distributing 5%, the Neuwalzwerk Bosperde, Germany's leading producer of wire netting, 6%, etc. Twenty-eight limited company manufacturers, which published their balance sheets during the second half of 1935, distributed 5.2% compared with 3.7% in 1934 and 1.4% three years ago.

✦ ✦ ✦

THE general tendency of the German iron and steel export trade continues favorable, and the total export volume is now nearly as high as the total production of finished steel three years ago.

✦ ✦ ✦

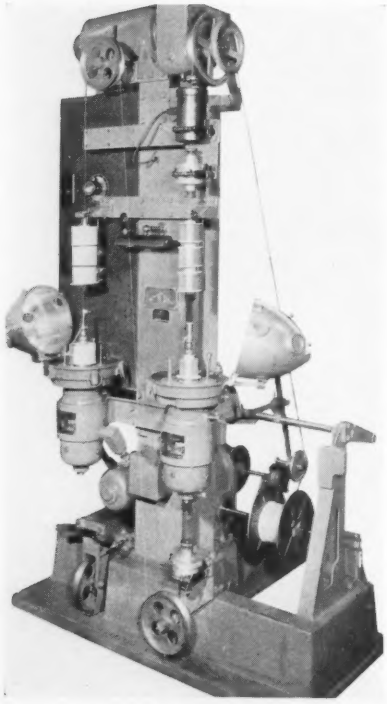
THOUGH the official quotations of the international wire rod cartel have been left unaltered at £ (gold) 4.10, and only the allotment is higher by 15,000 tons for the first quarter of next year, it is nevertheless almost impossible to buy wire rods at the official quotation, because the sellers demand extras for delivery in less than 7 or 8 weeks or for other reasons. The average price is five gold shillings higher. The demand for strong rods of 5/16" to 7/16" is still increasing as is the demand for rods in coils of 250 to 400 pounds.

✦ ✦ ✦

Russian Exports

RUSSIA is exporting small quantities of barbed wire to East Africa. The fact that the Russian ruble has been devaluated from 13.7 to only three French francs

SYNCRO • • •
does it again



"Type 2-B" Syncro Insulating Machine

THE new Syncro double flyer insulating machine spirally wraps two servings of like or different insulating materials at one continuous passage of the wire.

This machine is flexible and universal as it applies ribbon insulations (Cellophane, cellulose acetate, fine papers, etc.) and stranded insulations (Cotton, silk, etc.) with equal facility. Fine ribbon insulations are efficiently served by all Syncro machines with almost incredible speed and accuracy.

SYNCRO

— Write for facts and figures —

SYNCRO MACHINE CO.

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'Round the World With the Wire Industry

will be of no influence upon the export trade as the international valuation was already at about this figure, and even at three francs it is only possible to trade through official sources; the unofficial is 25 to 33% lower. Russia is exporting wire products in increasing quantities to the Far East.

✦ ✦ ✦

Netherland Producer to Manufacture Rolled Wire

NEDERLANDSCH Staalfabrieken v/h J. M. de Muinck Keizer, in order to further strengthen its position, has decided to make important plant extension and work in this connection has already begun. The subsidiary itself has announced that it will extend its activities to the manufacture of bar-iron, rolled wire, and various smaller profile iron. The present products of the mill are exported, while the possibility exists that the new products will be sold in the domestic market. The enlarged plant is expected to commence operations about the middle of 1936 and it is anticipated that work will be given to about 100 laborers.

✦ ✦ ✦

Aluminum Company Plant at Niagara Falls Resumes Operations

Dormant for the past five years, the local reduction plant of the Aluminum Company of America has resumed operations on a 50% capacity basis, according to an announcement by C. Sanford Thayer, general superintendent, who said approximately 125 former employes had been recalled to work. The first of four lines of pots was put into operation this week and a second line is being put into condition for operation in February. No date has been set for resumption of operations at the rolling mill here.

✦ ✦ ✦

Rome Cable Corporation Organized

Announcement has just been made of the organization of the Rome Cable Corporation with a capital of $1,000,000 to manufacture copper wire and cables for the electrical industry. The principals are all former officials of the Rome Wire Company. They are H. T. Dyett, H. W. Barnard, G. A. Scott, V. W. Collins and A. D. R. Fraser.

The Rome Wire Company was merged in 1927 with other wire companies into the General Cable Corporation.

✦ ✦ ✦

1936 Wire Association Meeting

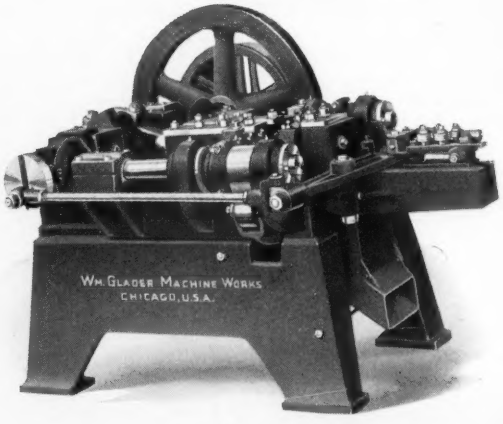
From October 19th to 26th are the dates selected for the 1936 meeting of the Wire Association.

The place will be Cleveland, O., and the meeting will be held in association with the National Metal Congress.

✦ ✦ ✦

GLADER

HIGH SPEED WIRE NAIL MACHINE



Machines are built in nine sizes to cover the most exacting requirements.

Our aim in the design of these machines has been for sturdy construction and long life. Main frame is of cast-steel, as well as most of the other working parts, and in those parts subject to the greatest wear and shock, we use an alloy steel that has been determined through years of experiment and mill service.

The performance of these machines, both as to production and low maintenance cost, has led to their exclusive selection in all of the recent major nail making machine installations.

Wm. Glader Machine Works

210 N. Racine Ave., Chicago, Illinois

New and Revised Standards for Wire

IN the January issue of "Industrial Standardization and Commercial Standards Monthly", the American Standards Association advises that their committee on insulated wires and cables (C8) report as follows:

✦ ✦ ✦

INSULATED Wires and Cables (C8)—Six of the eleven approved standard specifications under the jurisdiction of this committee have been revised during the past year, or are being revised. These are:

1. Specifications for 30 Per Cent. Rubber Insulation.—This standard has been revised and the title changed to "Specifications for Class A, 30 Per Cent Rubber Insulation." A letter ballot of the sectional committee is now being taken.

2. Specifications for Code Rubber Insulation.—A letter ballot of the sectional committee is now being taken.

Note: In the course of obtaining the first ballot on these two revisions, additional changes were found to be advisable and a second ballot on "revised revisions" is therefore being taken.

3. Three Specifications for Copper Magnet Wire.—All three specifications have been revised and the revised specifications have been submitted to the Electrical Standards Committee in accordance with the favorable letter ballot of the sectional committee.

4. Specification for Impregnated Paper Insulation.—It is expected that this revision which is being prepared by Technical Committee No. 5 will be submitted at the meeting of the sectional committee scheduled for early February 1936.

✦ ✦ ✦

ONE new standard, Specifications for Cotton Braid for Insulated Wires and Cables (C8.12-1935), was approved as an American Standard during the past year.

✦ ✦ ✦

EIGHT new standards have been proposed and action is now being taken on them as follows:

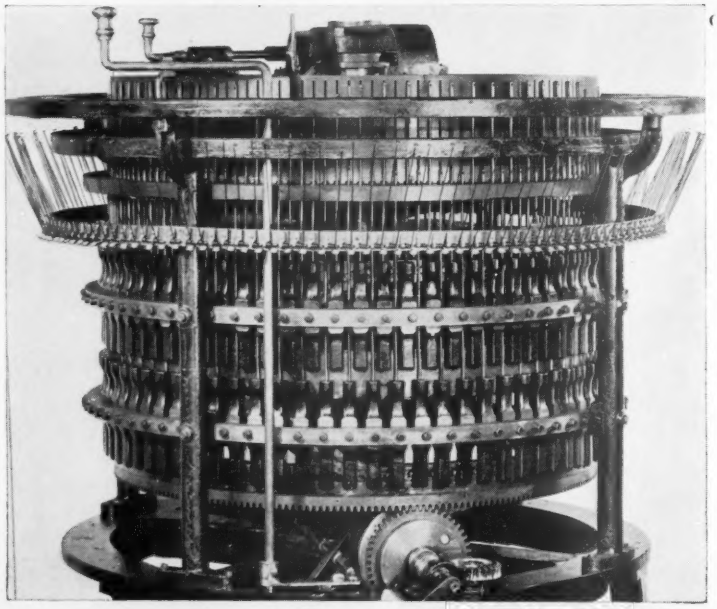
1. Specifications for Tree Wire Coverings.—This proposed standard has been approved by letter ballot of the sectional committee and has been submitted to the Electrical Standards Committee.

2. Specifications for Metallic Coverings.—This proposed standard has been prepared by Technical Committee No. 9 after much discussion resulting in a total of eight drafts. It will be submitted to the sectional committee at the meeting scheduled for early February, 1936.

3. Specifications for Class AO, 30 Per Cent Rubber Insulation for Wire and Cable for General Purposes.—This standard (making to date a total of three covering three classes of rubber insulation for wires and cables) is being balloted upon in the sectional committee.

4. Weather-Resistant Wire, U. R.C. Type.—A proposed standard for this class of wire has been under discussion in Technical Committee No. 12 for several months. It is expected that the cause of most of the controversy will have been disposed of and that a speci-

A NEW TYPE OF WIRE COVERING MACHINE!!



HIGH SPEED
INSULATING
WITH
PAPER, COTTON
AND
OTHER MATERIALS

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LOW OPERATING
COSTS

✦ ✦ ✦

MEDIUM PRICE

F. D. SAYLOR & SON

13095A Greeley Avenue DETROIT, MICH.

fication will be in the hands of the sectional committee on a letter ballot before the first of the year.

5. Varnished Cambric Insulation.—The work on this proposed standard has proceeded very slowly. The chairman of Technical Committee No. 6, which has this work in hand, reports that the standard was to have been ready for final ballot in his committee by about November 15, 1935. It will be several months before the standard will be ready for submittal to the Electrical Standards Committee.

6. Concentric Copper Conductors.—A proposed standard for concentric copper conductors involving, as the most important feature, a standard stranding table, is nearing completion and will probably be presented to the sectional committee at the coming meeting.

7. Saturants.—A specification is being developed by Technical Committee 8 for saturants for fibrous coverings of wire and cables. It is expected to be before the sectional committee at the coming meeting in February.

8. Finishes.—A specification is being developed by Technical Committee No. 8 for finishes for fibrous coverings of wires and cables. It is expected to be before the sectional committee at the coming meeting in February.

✦ ✦ ✦

IN addition to the above specific standards in various stages of completion, Technical Committee No. 4 is considering proposing a fourth standard for rubber insulation; namely, one for high voltages (over 5,000 volts).

✦ ✦ ✦

THE concrete results of the work of this committee to date are:

(a) Specification approved as

American Standard	5
Approved standards under revision	6
New specifications before sponsor	1
New specifications before sectional committee	1
New specifications in technical committee	6

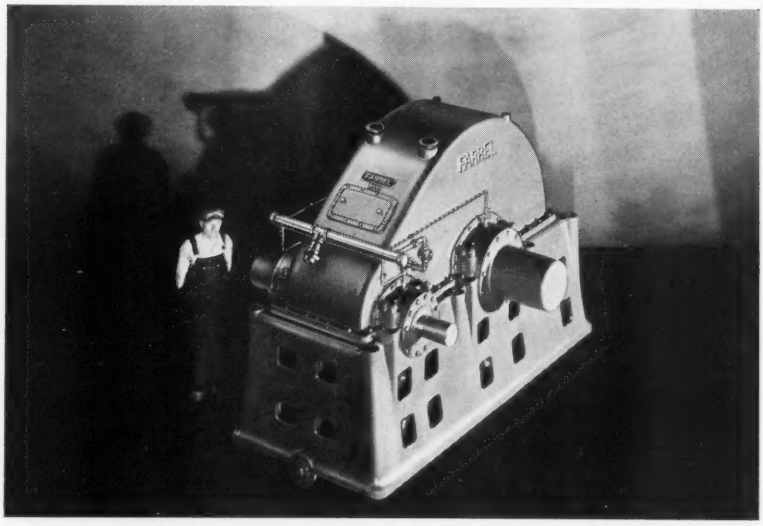
✦ ✦ ✦

PROGRESS during the year in the completion of new standards has been slower than anticipated. However, several will be before the sectional committee soon and it is hoped that all of them will have been submitted to the sponsor before the next annual meeting. The principal work of the committee will then be keeping the standards up-to-date through revisions when necessary.

✦ ✦ ✦

IT was expected that a proposal to issue a Book of Standards for Wires and Cables would have been submitted to the sponsor before this but it seemed advisable not to proceed with that project until revisions of existing standards and the proposed new standards had been approved.—F. M. Farmer, Chairman; F. W. Davidson, Secretary.

✦ ✦ ✦



QUIET DEPENDABLE POWER

THE ILLUSTRATION—*800 H. P. Heavy Duty Rolling Mill Drive . . . Sykes continuous tooth herringbone gears . . . roller bearings . . . central lubricating system . . . built-in sprays for the gear teeth . . . flood lubricated bearings.*

FARREL ROLLING MILL EQUIPMENT also includes: Rolling Mills—Chilled Iron and Special Alloy Iron or Steel Rolls—Universal Mill Spindles—Rod Mill Tables and Manipulating Equipment—Rod Coilers—Lead Presses for Pipe or Rod—Roll Grinding Machines—Roll Calipers — Gears—Mill Pinions—Drives up to 10,000 H. P.

Farrel Heavy Duty Mill Drives are designed by engineers with a thorough understanding of the conditions imposed by the higher speeds and heavier loads encountered in modern rolling mill operation.

The drives are scientifically proportioned, with large factors of safety, and are built of carefully selected materials, designed to provide great strength and rigidity. The continuous tooth herringbone gears are accurately generated by the Sykes process and mounted on roller bearings. (Sleeve bearings optional). Special attention is given to provide thorough lubrication.

Mechanical efficiency is high . . . vibration is absent . . . smooth, quiet, trouble-free operation and long life are assured.

FARREL-BIRMINGHAM
Company, Inc.
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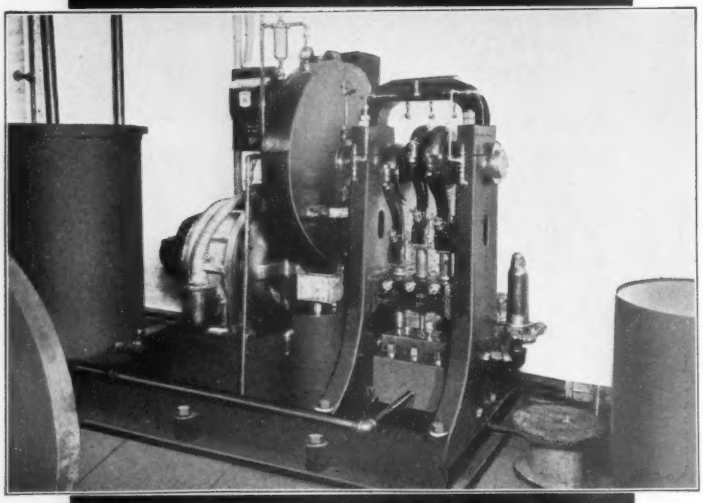
The ROBERTSON HYDRAULIC PUMP



has made Friends for Robertson wherever it's been installed

The outstanding success of this pump is due to SIXTEEN SEPARATE CONSTRUCTION FEATURES . . . the advantages of which have been time-tested under severe service conditions in many large plants. Robertson Hydraulic Pumps have been PROVEN to give long, dependable service at minimum operating and maintenance costs. Indeed, so satisfactory has been their performance that many users have standardized on Robertson equipment, as a result.

Briefly . . . from our knowledge of the requirements of the wire and wire products industry . . . from the vantage point of 77 years of specialization in the manufacture of hydraulic equipment . . . from the standpoint of the service records of this pump . . . we can safely say that the Robertson Pump is an exceptional value, unique among high pressure hydraulic pumps. And—WE CAN SHOW YOU WHY. Write today . . . there is no obligation.

Robertson makes all types of lead-encasing machinery required by rubber hose and electrical cable makers including Extrusion Presses, Hydraulic Pumps, Melting Furnaces and Pots, Dies and Cores, also Lead Sheath Stripping Machines and Hydro-pneumatic Accumulators.

John ROBERTSON CO. INC. — Pioneers~Since 1858

125-37 Water Street — Brooklyn, N. Y.

Recent Developments in Tungsten Die Practice

(*Continued from page 75*)

finish practically as good as the semi-finished nut previously made from bar, and the size across the flats is held to closer limits making it possible to have much better wrench fits when assembling the nuts.

✦ ✦ ✦

IN addition to the above applications, considerable work has been done in working out the details and design of dies for use as upsetting punches in cold headers or trimmers. This development is just under way but the preliminary test would indicate that there is a possibility of its proving successful within the next year or so.

✦ ✦ ✦

THE most recent developments in tungsten carbide die practice can be summarized as:

1) The recognition by the mill that die costs can be reduced by studied application.

2) The recognition by the mill that improved methods for die use and care make it possible to save money by using smaller nibs.

3) Expansion of the use of carbide dies for producing sheet metal parts.

4) The application of burnishing dies in the nut and bolt industry.

5) The serious attempt being made to use cemented carbide for upsetting punches and header dies.

✦ ✦ ✦

Wire Association Meeting 1936

THE National Metal Congress and Exposition, with which the Wire Association holds its associated meeting, has decided to hold the 1936 convention at Cleveland.

✦ ✦ ✦

THE date is October 19th to 23rd inclusive. This is later than usual for the National Metal Congress but is the earliest date which could be arranged in order to allow sufficient time for the removal of the exhibits at the Great Lakes Exposition and the installation of the exhibits at the National Metal Congress. As a consequence the convention issue of WIRE AND WIRE PRODUCTS will be the October, 1936 issue instead of September as has usually been the case during previous years.

✦ ✦ ✦

Tantalum

A NEW 48-page book entitled "Tantalum" has just been published by the Fansteel Metallurgical Corp., North Chicago, Ill. The book contains very interesting data to users of tantalum and tantalum wire as it has been prepared as a source of technical information about tantalum and its uses rather than simply a sales promotion publication.

✦ ✦ ✦

THE text includes information on tantalum as a metallic element and as a metal, how it can be used successfully for various purposes. The details include descriptions of the following:

Physical Properties

1—Density
2—Mechanical Properties
3—Thermal Conductivity
4—Reflectivity
5—Radiation
6—Thermal Expansion
7—Color
8—Electrical Properties
9—Magnetic Susceptibility
10—Electrochemical Properties
11—Chemical Properties

✦ ✦ ✦

A COPY of the book will be supplied without charge to anyone who requests it.

✦ ✦ ✦

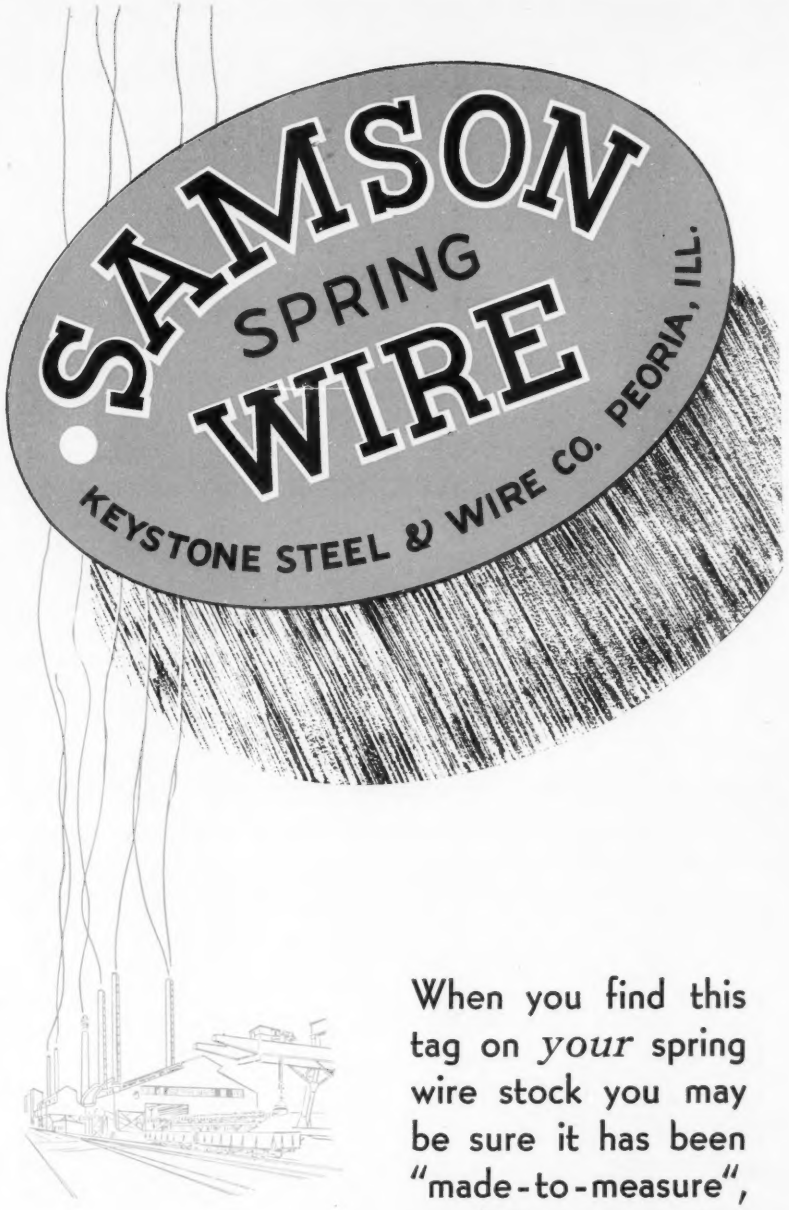
Meetings of the American Society for Testing Materials

A LIST of the meetings of the American Society for Testing Materials to be held during 1936 with dates and cities appears below:

1936 Regional Meeting, Wednesday, March 4, Hotel William Penn, Pittsburgh
1936 Group Meetings of A. S. T. M. Committees, Monday, March 2, through Friday, March 6, Hotel William Penn, Pittsburgh
1936 (Thirty-ninth) A. S. T. M. Annual Meeting, June 29-July 3, Chalfonte-Haddon Hall, Atlantic City

✦ ✦ ✦

AT the regional meeting, a Symposium on High-Strength Constructional Metals will be held. This comprises five papers dealing with alloys of copper, aluminum and magnesium alloys, nickel and its alloys, carbon - and low-alloy steels and corrosion - resisting steels. Further details of this symposium will be sent to journals whose readers would be presumed to have direct interest in the subject.



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or Low Carbon:

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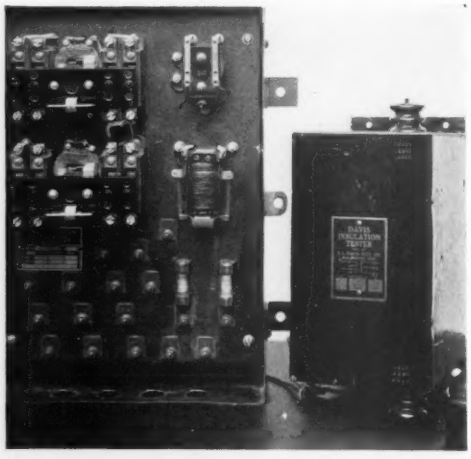

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Exports and Imports

(*Continued from page 91*)

tria, 10,389 square feet, Germany, 10,024 square feet, Sweden, 9,657 square feet, and France, 7,594 square feet, covered the entire trade.

✦ ✦ ✦

WIRE heddle imports, 180,000 pieces, declined sharply (80 percent) from those received in October, and were supplied entirely by France.

✦ ✦ ✦

RECEIPTS of wire fencing and netting, galvanized before weaving, 228,480 square feet, sharply gained 168,480 square feet over the October total, and came wholly from the Netherlands. Of the galvanized after weaving grade, an aggregate of 1,385,459 square feet was received, a decline of 122,026 square feet from the volume moving in the previous month. The countries of supply were the Netherlands 864,025 square feet, Belgium, 513,534 square feet, and the United Kingdom, 7,800 square feet.

✦ ✦ ✦

EXPORTS of iron and steel wood screws during November, 1935, totaled 51,132 gross valued at $6,654. Of this total Japan took 10,955 gross valued at $1,342; Cuba 8,650 gross valued at $991; United Kingdom 7,110 gross valued at $1,345; Union of South Africa 7,066 gross valued at $672; Colombia 4,685 gross valued at $506; Canada 4,623 gross valued at $397; Nicaragua 1,315 gross valued at $181; Panama 1,175 gross valued at $174; Philippine Islands 1,075 gross valued at $179.

✦ ✦ ✦

EXPORTS of brass wood screws during the same period amounted to 9,115 gross valued at $2,492. Of this total Canada took 2,767 gross valued at $327; Panama 1,792 gross valued at $812; Cuba 1,473 gross valued at $373; United Kingdom 679 gross valued at $377.

✦ ✦ ✦

IMPORTS of wood screws during the same period amounted to 12,552 gross valued at $1,102 of which amount Belgium supplied 8,200 gross valued at $499 and Sweden 3,596 gross valued at $410.

Rust Proofing at Low Cost

EXCELLENT rustproofing at low cost is claimed for Cromodizing, a new process of the American Chemical Paint Company, of Ambler, Pa. By preventing rust from forming beneath paint films, this treatment solves the problem of keeping steel units in serviceable condition. Cromodizing is adapted to protecting any type of steel surface regardless of size, shape or previous processing. Because the cost of the process is decidedly below that of other pretreatments, cromodizing makes available to a wide field of steel products the benefits of improved and more lasting finish.

✦ ✦ ✦

PROMINENT automobile manufacturers now using this treatment have shown in tests that cromodizing will at least triple the life of the finish on steel units. These manufacturers also report that paint has a better luster when applied over cromodized steel.

✦ ✦ ✦

An Unique Method

THE actual process is a departure from all previous conceptions of rustproofing. Instead of coating the steel with a layer of phosphates as do other commercial methods, cromodizing goes to the primary causes of rust and changes the steel so that the surface currents that induce rusting are stopped.

✦ ✦ ✦

TO obtain this unusual type of protection, steel products are dipped in a bath or sprayed with a solution of a proprietary chemical called Cromodine. Only one minute is required for this Cromodine treatment. As with any other rustproofing process, the metal is first cleaned and following the chemical treatment is rinsed and dried. However, less care is necessary in cleaning than is the case with other processes. Generally speaking, cromodizing has been

(*Please turn to page 104*)

AN

ANNOUNCEMENT

of interest to you

For a number of years, Oakite materials have been used successfully by many wire mills. As a result of our long, successful experience in this field, we have been able to develop a NEW and SUPERIOR COATING MATERIAL known as

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If you are interested in the elimination of lime and its attendant disadvantages, we will be pleased to have you communicate with us. No obligation.

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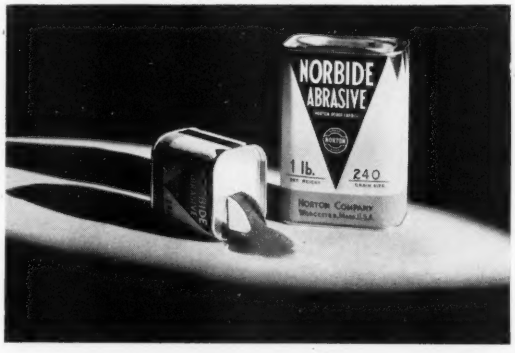

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For Economical Shaping, Ripping and Finishing

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NORBIDE is the trade mark for Norton Boron Carbide (B_4C)

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NORTON ABRASIVES

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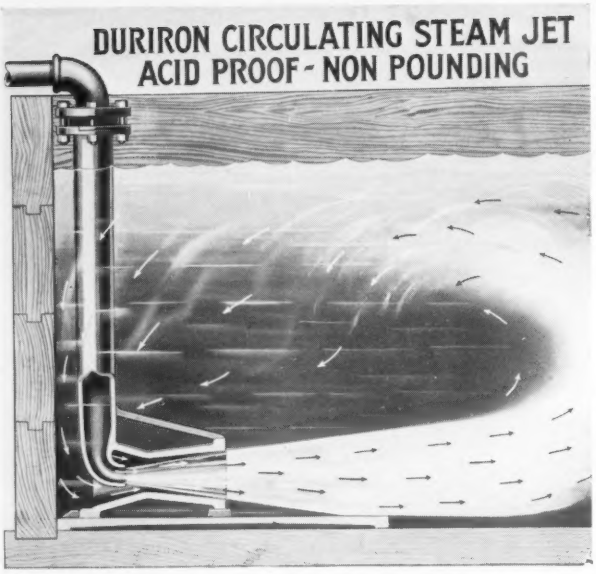

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COMPLETE circulation of pickle liquor . . . rapid heating . . . no destructive pounding. Duriron Heating and Circulating Steam Jets heat quicker, save the tank—and acid—and cut down steam requirements.

Send for Bulletin 165, including a table for figuring steam requirements in pounds per hour.

THE DURIRON COMPANY, Inc.

445 N. FINDLAY ST. DAYTON, OHIO

Rust Proofing at Low Cost

(*Continued from page 103*)

made clean-cut and foolproof, so that it gives consistent results when supervised by production employees. Large units now in operation are showing an ease of control and a consistency of rust-proofing heretofore unknown to the industry.

✦ ✦ ✦

Resists Distortion

BY changing the surface instead of coating it, cromodizing has the added advantage of forming a protection that is as flexible and as ductile as the steel itself—a protection that will not break and cause paint failure when the product is bent or distorted. Cromodized steel automobile parts in tests have shown great resistance to the corrosive action of salt used in the winter to remove ice from roads, as well as strong protection against the action of chemicals used to "lay" dust in summer.

✦ ✦ ✦

PAINT applied over Cromodized steel has a better luster than when applied over any other pretreated surface, because there is no rough coating to absorb paint irregularly. Cromodized steel, too, has the effect of oxidizing the lower part of the finish film, forming in effect a cement that firmly binds the paint to the metal. Because of these factors, painted cromodized products have a much better appearance than painted steel products given some other pretreatment.

✦ ✦ ✦

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A PICKLING STABILIZER ▲ ▲ ▲
FOR CARBON STEELS ▲ ▲ ▲

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The strong passivating effect of this excellent inhibitor insures a bright finish and forms a sound basis for a bright drawing technique—

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DELANY CHEMICAL CO.

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PROCEEDINGS AND DISCUSSIONS

of the 1935

WIRE ASSOCIATION MEETINGS

Price $5.00 Per Copy

Direct Rolling of Metals

Rolling Metals

FEW of the recent developments in the metal industries are attracting more serious interest and attention than the direct rolling of metals. This new process, now in small commercial production on brass and well under way for several other metals, including steel, is revolutionary in character and has been described as promising to bring our steel mills into step with other more progressive industries.

✦ ✦ ✦

THE idea is not new—Bessemer himself realized its importance and possibility, and actually tried it in 1846. A patent was issued as early as 1865. But apparently Bessemer was unable to complete several of the possibilities that seemed promising to him—he is said to have tried to make sheet glass directly from molten glass, but is was half a century before another iconoclast went through to commercial practice of continuous glass making.

✦ ✦ ✦

THE creator of the direct rolling process now under development is familiar with Bessemer's work, and with the limitations with which he and his successors in the field were confronted. His record and the position and the development record of the various prominent companies now understood to be backing the process at its present well-advanced stage indicate an excellent probability of early commercial success in several metal fields. In the steel industry in particular, success means cheaper steel with less capital investment.

✦ ✦ ✦

THE process is in principle simple. Molten metal is poured between rolls spaced so closely as to approximate the sheet thickness desired. Chilling occurs almost simultaneously with the rolling operation. It answers one major requirement of a method that will stand competition, the requirement of the motto attributed to Kettering's office wall: "When you find it, it will be simple." But no metal man need be told that simplicity in principle does not imply lack of practical difficulty in establishing commercial operation. Many were the complications to be resolved in reaching the present stage, and all the skill and commercial strength now back of the various installations will probably be needed before the large-scale operation is achieved. The process has been stepped gradually and experimentally from lead through brass, aluminum and copper to steel, but is still in its nurse-controlled infancy even in the brass operation.

✦ ✦ ✦

WITH steel, two major difficulties are now being faced — crystal structure and surface characteristics. Neither is yet entirely comparable in the direct-rolled product with the present commercial grades of steel sheet, although acceptable for some large uses. Brass, however, is reported to show a highly satisfactory crystal structure and general physical character, possibly an improvement in this respect over its logical competitors, and there is consequently reason to believe that satisfactory grain and surface will be attained on further development with steel.

✦ ✦ ✦

THE steel industry has recently invested in the very successful continuous rolling mill that had made previous practice obsolete. This investment is so large that the progress of a yet simpler method eliminating the comparatively new continuous roll is being watched closely, although the project is still in such an early stage that its ultimate success, course, and effect cannot safely be predicted*.

* From Bulletin of Arthur D. Little & Co., Consulting Engineers.

SCOTT WIRE TESTERS

An inexpensive, motor driven, quick acting testing machine for small wires.

Suitable for factory or laboratory use.

Built in several capacities.

Highest maximum 50 lbs.

Lowest maximum 10 lbs.

HENRY L. SCOTT CO.

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Outstanding Personalities

(*Continued from page 93*)

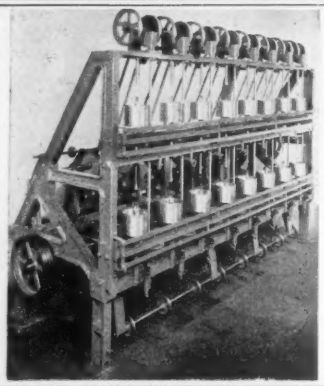
Thomas N. Armstrong Jr.

A. J. Wadhams, Manager of development and research, The International Nickel Company, Inc., has announced the addition of **Thomas N. Armstrong, Jr.,** to the technical staff. Mr. Armstrong, who will handle the steel castings development for the company, will operate out of the New York office. His services will be available to industry at large.

✦ ✦ ✦

MR. **Armstrong** is well known in metallurgical circles as a result of various papers presented before the American Society for Metals and contributions to the technical press. He was formerly Associate Metallurgist at the Norfolk Navy Yard, Portsmouth, Va., and prior to that spent several years with the Andrews Steel Company, Newport, Kentucky, in open hearth furnace work. He is a graduate of the University of Kentucky with a degree in Metallurgical Engineering.

✦ ✦ ✦



Aimco New Wire Insulating Machine

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Versatile—applying cotton, silk, paper, and transparent film such as "Cellophane", with equal facility and at high speeds.

Production figures gladly furnished.

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FLEXIBLE CASING AND
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AND WIRE MILL EQUIPMENT

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WIRE BRAIDING MACHINES

SINGLE, DOUBLE OR TRIPLE DECK
VERTICAL OR HORIZONTAL TYPE

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A NEW BOOK ABOUT WIRE!
650 pages. 450 charts, photomicrographs and illustrations
Translated and Published by Kenneth B. Lewis, Consulting Engineer
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SEND ORDERS TO
WIRE and WIRE PRODUCTS
17 E. 42nd Street, New York

Aluminum Wire

(*Continued from page 71*)

portance of aluminum in the electric power industry, more than 80 per cent of the existing 220,000-volt lines in the United States and Canada are aluminum cable, steel reinforced. Recent developments have even further broadened the field for aluminum wire. The production of stronger alloys, some of them as strong as structural steel, has increased the number of new uses to a degree which would otherwise be impossible.

✦ ✦ ✦

ALUMINUM wire has many points in its favor. It is light, ductile, resistant to atmospheric attack, strong, adaptable to bright finishes, resistant to many chemical compounds, and is produced at a price which compares favorably with that of other non-ferrous metals. Most of the many articles made from non-ferrous wire products can be economically made from aluminum wire, particularly when consideration is given to some of the advantages of aluminum.

✦ ✦ ✦

ALUMINUM wire is used in the manufacture of commercial and insect screens, window guards and ornamental grilles, woven baskets and containers, milk bottle carriers, screw-machine products, rivets, tags, slide fasteners, mechanical lead pencil spirals, woven armor for insulated cable, metallic fabrics and tinsel, flexible tubing, fins for tubing, chains, umbrella ribs, rubber hose mandrels, metallic wool, key stock, oxide-finished wire for magnet construction, rotor windings for high-speed electrical equipment, and reinforcements for large diameter hose.

✦ ✦ ✦

IN a resume of this kind, it is not idle to discuss the future and the possibilities it holds for aluminum wire. There is no doubt that the type of progress which has characterized the entire aluminum industry will find a counterpart in the progress that will be made by aluminum wire. New alloys and new uses will greatly broaden the present market.

✦ ✦ ✦

Saylor Circular Loom

A NEW high speed circular loom for large diameters, is now manufactured by F. D. Saylor & Son, Detroit, Michigan.

+ + +

IT has many new features and puts on a covering of a hard finish, for a hose tubing, at a speed much greater than ever attempted with a circular loom.

+ + +

THE Machine is ball-bearing throughout and protected by automatic stop motion in the threads and carries a large shuttle package, giving a high production with few stops.

+ + +

IT applies a loom covering on wire or makes a tube to any desired pick per inch, in diameters from ½" to 3¼".

PROCEEDINGS
AND DISCUSSIONS
OF THE 1935

Wire Association
Meetings

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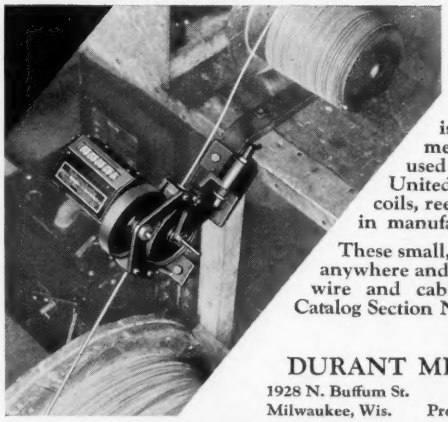

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These small, compact machines can be mounted anywhere and are adapted to bare or insulated wire and cable .005 to .5 in. Send for Catalog Section No. 3.

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THE F. B. SHUSTER CO.
New Haven, Conn.
Straightener Specialists Since 1866

New Dustube Collector

WHAT is claimed to be the most practical and simplest operating Dust Collector ever built, is announced by The American Foundry Equipment Company, Mishawaka, Indiana, and is called "The American Dustube Collector".

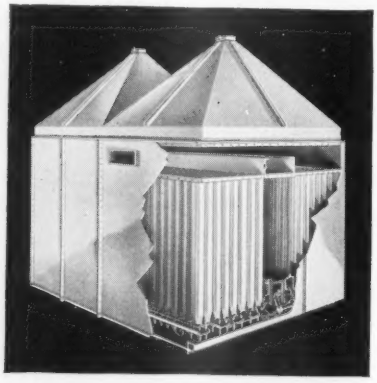
✦ ✦ ✦

IT is simple in design, with no efficiency lost, but rather greater effectiveness gained. A glance at the illustration will give a clear conception of its construction and operation.

✦ ✦ ✦

THE heart of the Dustube Collector is the long tube made of special woven fabric best suited for filtering of ordinary dust, and this fabric can be changed to suit the specific installation. The tubes are hung from racks in the ceiling. Self-acting dust seals hold the tubes to the bottom, without clamps, bands, or intricate devices.

✦ ✦ ✦



THE seal is as positive in operation as it is simple in construction, and there is no leakage of dust. Spring suspension of the dust tubes maintain the proper tension on the cloth making it easier to insert to take out dust tubes when desired.

✦ ✦ ✦

IN this multiple tube design every tube works independently. In the case of a damaged tube, it can be easily unhooked, rolled up and placed in the inlet seal at the bottom, thus sealing the opening temporarily, without interfering with the operation of the complete equipment. All tubes are easily accessible and new ones can be inserted in less than five minutes.

✦ ✦ ✦

THE tubular design of this dust collector, it is claimed, insures low operating and maintenance cost. Because of the large air chamber and the open design of the tube inlets, the suction within the casing is very low. This not only means a larger saving in fan horse power, but there is less wear by erosion on the interior of the equipment. Also, this design eliminates the possibilities of stacking or caking of dust in the tubes which would retard efficiency, increase fan horse power consumption and increase the maintenance cost.

✦ ✦ ✦

THE abatement of industrial dust, both coarse and fine, eliminates the possibility of industrial diseases, creates better working conditions for employees, and at the same time eliminates hazards of dust explosions and fires.

✦ ✦ ✦

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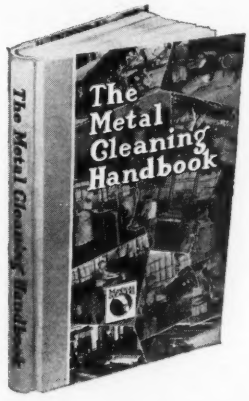
Metal Cleaning Handbook

A VERY thorough research on the subject of metal cleaning is now published in the form of a handbook written by Robert W. Mitchell, entitled, "The Metal Cleaning Handbook", copyrighted and published by the Magnus Chemical Company, Garwood, N. J. The book contains 216 pages, is profusely illustrated and sells for $1.00.

✦ ✦ ✦



THE contents include wet cleaning with acid solutions, alkali solutions, soap solutions, solvents and electrolytic action, cleaning in tanks, tumbling machines, whirling machines, continuous washing machines; dry cleaning by tumbling; spray cleaning; steam and vapor cleaning; equipment and accessories for production metal cleaning—tanks, agitators, heaters, dipping baskets, pumps, cranes, conveyors; proper materials and methods for cleaning each of the various metals from aluminum to zinc . . . lubricants for cutting, blanking, forming and drawing sheet metals and wire; maintenance cleaning.

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ABRASIVES—
Norton Co., Worcester, Mass.

ANNEALING POTS AND BOXES
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.

ANODES—Nickel
Seymour Mfg. Co., Seymour, Conn.

ARMORING EQUIPMENT
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Seymour Mfg. Co., Seymour, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

BAKERS—Rod and Wire
Lindberg Engineering Co., Chicago, Ill.
Morgan Construction Co., Worcester, Mass.
Morrison Engineering Co., Cleveland, O.

BORON CARBIDE—
Norton Co., Worcester, Mass.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
American Machine & Foundry Co., Amaloy Div., Brooklyn, N. Y.
Delany Chemical Co., Tacony Station, Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin Co., The Wm., Pittsburg, Pa.

CLEANING & PICKLING EQUIPMENT
Broden Construction Co., Cleveland, O.
Duriron Co., The, Dayton, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

COATING—Protective
American Lanolin Corp., Lawrence, Mass.

COILERS—Sheet, Strip and Wire
Broden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Ansonia, Conn.
H. J. Ruesch Machine Co., Newark, N. J.

CONDUITS—Iron and Steel
Youngstown Sheet & Tube Co., Youngstown, Ohio.

CRANES—Wire Mill
Cleveland Electric Tramrail Div., of Cleveland Crane & Eng. Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Diamond
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Cochaud Wire Die Co., New York.
Kelly Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Cochaud Wire Die Corp., New York.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Wks., N. Y.

DIES—Rod and Tube Drawing
Bissett Steel Co., Div. of Tungsten Electric Co., Cleveland, O.
Carboloy Co., Inc., Newark, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Vianney Wire Die Works, New York, N. Y.

DIES—Tantalum Carbide
Bissett Steel Co., Div. of Tungsten Electric Co., Cleveland, O.
Kelly Wire Die Corp., New York, N. Y.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Bissett Steel Co., Div. of Tungsten Electric Corp., Cleveland, O.
Carboloy Co., Inc., Newark, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Vianney Wire Die Works, New York, N. Y.

DRAW BENCHES
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

ENGINEERS—Consulting Galvanizing
W. H. Spowers, Jr., New York, N. Y.

ENGINEER—Consulting Wire Mill
Lewis, Kenneth B., New York, N. Y.

BUYERS' GUIDE, Continued

ENGINEERS—CONSULTING—Non-ferrous Wire Mill
New Products Development Corp., Yonkers, N. Y.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FILLERS—Paper for Cable
E. W. Twitchell, Inc., Phila., Pa.

FURNACES—Annealing
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Automatic
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Electric
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.

FURNACES—Hardening and Tempering
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Lead Melting
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
John Robertson Co., Brooklyn, N. Y.
Surface Combustion Co., Toledo, O.

FURNACES—Non-Oxidizing
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Wire, Strip and Sheet
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

GEARS—Wire Mill
Farrel-Birmingham Co., Ansonia, Conn.

GRINDERS—Roll
Farrel-Birmingham Co., Ansonia, Conn.
Norton Co., Worcester, Mass.

HANDLING EQUIPMENT—Material
Cleveland Electric Tramrail, Div. of Cleveland Crane & Eng. Co., Wickliffe, O.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Delany Chemical Co., Tacony Station, Philadelphia, Pa.
Parkin Co., The Wm., Pittsburgh, Pa.

INSULATION—Cable or Cable Filler
E. W. Twitchell, Inc., Phila., Pa.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LININGS—For Acid Tanks
American Hard Rubber Co., New York, N. Y.

LUBRICANTS—Wire Drawing
American Machine & Foundry Co., Amaloy Div., Brooklyn, N. Y.
R. H. Miller Co., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
J. T. Robertson & Co., Syracuse, N. Y.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Saylor, F. D. & Son, Detroit, Mich.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
New England Butt Co., Providence, R. I.
Saylor, F. D. & Son, Detroit, Mich.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Machinery Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Coilers
Broden Const. Co., Cleveland, O.
Farrel-Birmingham Co., Ansonia, Conn.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
Farrel-Birmingham Co., Ansonia, Conn.
H. J. Ruesch Machine Co., Newark, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Covering Wire—
Saylor, F. D. & Son, Detroit, Mich.
Syncro Machine Co., Newark, N. J.

MACHINERY—Cutting
Broden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Ansonia, Conn.
Hallden Machine Co., Thomaston, Conn.
F. B. Shuster Co., New Haven, Conn.
W. A. Schuyler, New York, N. Y.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
H. J. Ruesch Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
New England Butt Co., Providence, R. I.
Saylor, F. D. & Son, Detroit, Mich.
Syncro Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Material Handling
Cleveland Electric Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.

MACHINERY—Measuring Wire & Cable
Davis Electric Corp., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis., and Providence, R. I.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader Mfg. Co., Chicago, Ill.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Ansonia, Conn.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
W. A. Schuyler, New York, N. Y.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Ansonia, Conn.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Strip Covering
Farrel-Birmingham Co., Ansonia, Conn.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
Farrel-Birmingham Co., Ansonia, Conn.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila. Pa.
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry and Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Special—Combination Machine for Drawing, Cutting-to-length, Straightening and Reeling Bars from Coil in One Operation (Shumag Type)—
W. A. Schuyler, New York, N. Y.

MACHINERY—Spooling
American Insulating Machinery Co., Phila.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
H. J. Ruesch Machine Co., Newark, N. J.
W. A. Schuyler, New York, N. Y.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Swaging
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Worcester, Mass.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

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MACHINERY—Testing Size of Wire
R. L. Davis Elec. Co., Wallingford, Conn.

MACHINERY—Testing Wire
Henry L. Scott Co., Providence, R. I.

MACHINERY—Tinsel Rolling Mills
Amer. Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Turks Head, For Rolling Special Shaped Wire
Standard Machinery Co., Auburn, R. I.

MACHINERY—Welding Wire
Micro Products Co., Chicago, Ill.
F. B. Shuster Co., New Haven, Conn.
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
W. A. Schuyler, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Auburn, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Wrapping Wire
W. A. Schuyler, New York, N. Y.

MATERIAL HANDLING EQUIPMENT—
Cleveland Electric Tramrail Div., of Cleveland Crane & Eng. Co., Cleveland, O.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

OVENS—Annealing or Drying
Lindberg Engineering Co., Chicago, Ill.

PAPER—Insulating
E. W. Twitchell, Inc., Phila., Pa.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Delany Chemical Co., Tacony Station, Philadelphia, Pa.
Parkin Co., The Wm., Pittsburgh, Pa.

PICKLING—Tank Linings
American Hard Rubber Co., New York, N. Y.

POTS—Annealing, Case Hardening and Tempering
Lindberg Engineering Co., Chicago, Ill.

POTS—Lead Melting
Farrel-Birmingham Co., Ansonia, Conn.
John Robertson Co., Brooklyn, N. Y.

PRESSES—Hydraulic and Mechanical
Farrel-Birmingham Co., Ansonia, Conn.
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

REEL AND TENSION STAND—
Sleeper & Hartley, Inc., Worcester, Mass.

REEL CRUTCHES
Watson Machine Co., Paterson, N. J.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS—
Morrison Engineering Co., Cleveland, O.

RODS—Wire—Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

ROLLS—
Farrel-Birmingham Co., Ansonia, Conn.

RUST PROOF COMPOUND
American Lanolin Co., Lawrence, Mass.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Republic Steel Co., Youngstown, O.
Superior Sheet Steel Co., Canton, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.
J. T. Robertson & Co., Syracuse, N. Y.

STRIP—Brass, Zinc and Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TESTERS—Wire
Henry L. Scott Co., Providence, R. I.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS
H. J. Ruesch Machine Co., Newark, N. J.

TURKS HEADS—
Standard Machinery Co., Auburn, R. I.

VALVES AND FITTINGS—Acid Proof
Duriron Co., The, Dayton, O.

VULCANIZERS
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS
American Insulating Mach'y Co., Phila., Pa.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Enameled For Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Co., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Company, Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Non Ferrous to Specification For Special Purposes
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel and Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Seymour Mfg. Co., Seymour, Conn.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE AND STRIP—Brass, Zinc
Platt Bros. & Co., The, Waterbury, Conn.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

Make Your Plans Now To Attend

THE ANNUAL WIRE ASSOCIATION MEETING AND CONVENTION

To Be Held In Association With The

NATIONAL METAL CONGRESS

At CLEVELAND, O. OCTOBER 19th to 23rd, 1936

THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

Electric Cable and Wire Rope Machinery:

STRANDERS	Planetary & Rigid Frame types (*horizontal and vertical.*) High-Speed Tubular and Built-up types.
BUNCHERS	High-speed types for spools up to 1500 lb. capacity.
ARMORING MACHINES	For Wire (*planetary type*) and for Tape.
PAIRING & TRIPLING MACHINES	For Bare & Insulated Wire.
CLOSERS	For Wire in Planetary, High-speed & Angular types.
CLOSERS & CABLERS	For electric cable in Planetary and Angular types.
TAPING MACHINES	Eccentric and Concentric types, for Paper, Friction and Varnished Cambric and Burlap types.
TAPING HEADS	For applying steel tape in Eccentric and Concentric high-speed types.
JUTE & BURLAP	Applying Heads.
THREAD SERVERS	For Cotton, Asbestos, etc. application on hose and wire.
COMPOUND TANKS	Electrical or Steam heated for machine or unit application.
CHALK APPLIERS	Wet and Dry types.
CAPSTAN SECTIONS	With Single tapered and double grooved wheels, with Lay Control by gears or variable speed transmission.
LET OFF REEL STANDS	Shaft and Shaftless types, for any size of reels.
WINDERS	For steel and copper, in single or multiple head units.
COILING MACHINES	Power or manual drive for package coiling—also for warehouse and shipping room use.
COILING HEADS	For wire rope and insulated wire and cable.
TAKEUP STANDS	Inclined frame, Shaftless and Heavy-duty types.
TRAVERSES	Light and Heavy, manual, mechanical and motorized.
TEMPERING & GALVANIZING MULTIPLE HEAD TAKEUPS	For wire.
MEASURING MACHINES	For Length Measurement.
ELECTRIC PATCH VULCANIZERS	
SATURATING, WAXING & GREASING TANKS	Gas fired and Electrical.
WIRE TINNING MACHINES	Gas fired and Electrical.
CABLE PEELERS	For removing lead sheathing and insulation.
POLISHING HEADS	Separately or Motor driven.
REEL CRUTCHES	For turning heavy reels in handling and shipment.
MOTORIZED WINCHES	For general duty in cable and rope plants.
CUTTERS	For wire rope, cable and chain.
SPOOLS	Heavy-duty for Rope-Mills and Cable-plants.

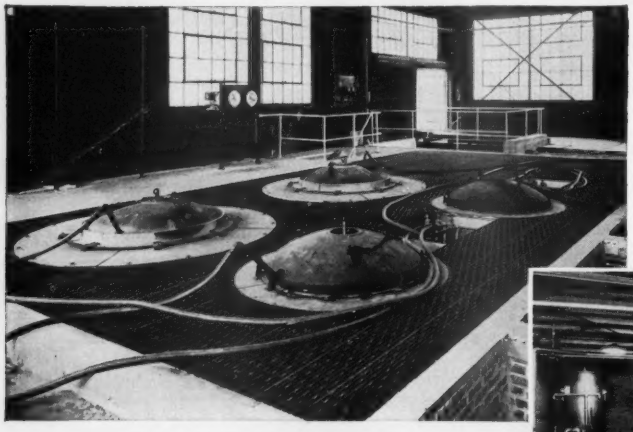
Send for descriptive catalogue.

ELECTRICAL WIRE AND CABLE—WIRE ROPE AND CORDAGE MACHINERY

Bright Annealing Wire

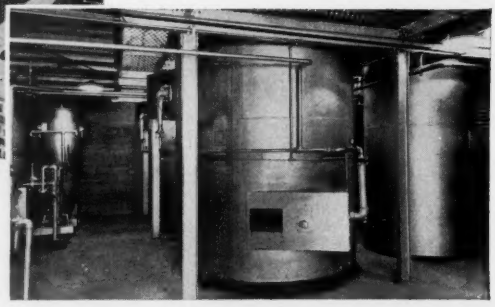
AND

Normalizing and Spheroidizing Rod



Above—A recent installation for annealing wire in coils—similar installations for normalizing and spheroidizing rod, bright annealing wire, etc.

Below — The "Elfurno" Gas Generator shown at left of the picture below provides the special atmosphere used in this equipment for bright annealing steel wire in coils.



Another New Installation

Another new three-battery combination unit similar to the illustration above was recently installed for normalizing or spheroidizing rod and bright annealing wire. This installation is also equipped with an "Elfurno" generator for control of surface condition on both rod and wire. Rod and wire can be handled in the same unit.

Advantages And Savings

Other advantages of The Electric Furnace Company's new pit type furnace include: increased tonnage per pit. Improved fuel economy. More uniform anneal. Improved surface condition. Lower maintenance cost. Decreased annealing time and labor requirements. Maximum flexibility—produces a bright surface, semi-bright or otherwise, as desired.

Other Outstanding Installations

Several similar installations have already been made for normalizing and spheroidizing rod and arranged for controlled atmosphere for bright and clean annealing wire.

We have also made a number of other outstanding continuous and semicontinuous installations for clean and bright annealing ferrous and nonferrous products, including tubing, sheet, strip, stampings, wire and for scale-free heat treating bolts and other finished products.

Two More Installed

Two more continuous type controlled atmosphere furnaces for bright and clean annealing wire are now being installed in prominent wire plants.

We specialize on building Electric and Fuel Fired Furnaces and time and labor saving auxiliary equipment to suit the customer's specific requirements. Send for printed matter showing some of our latest designs.

The Electric Furnace Co., Salem, O.

Head Office and Works of The Electric Furnace Company, Salem, Ohio . . . located on the main line of the P. R. R. . . . the largest plant in the country devoted exclusively to designing and building electric and fuel-fired industrial furnaces and auxiliary equipment.